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Original Articles.

CESAREAN SECTION: A CONSIDERATION OF INDICATIONS, TECHNIQUE, AND TIME OF OPERATING.

BY CHARLES M. GREEN, M.D., BOSTON,

From the Clinic of the Boston Lying-in Hospital.

ON June 29, 1907, the Boston Lying-in Hospital completed a series of one hundred Cesarean sections; and the Staff published a conjoint study of the series, dealing with the indications, technique, convalescence, the Cesarean baby, and a consideration of the repeated sections. In the eight years which have since elapsed the total number of sections has risen above three hundred, and increased experience and observation of cases have led to certain changes of opinion as to time and technique of operation; the previously recognized indications have also been considerably extended. These changes in method and time of operating, in the ante-partum study and preparation of patients, and the enlarged indications for abdomino-uterine section may be shown in a measure by a consideration of a series of twenty sections which were performed during the writer's four months' active service, February to June, 1915.

In regard to the time of operating, the writer has come to the conclusion that except in certain cardiac, toxæmic, and placenta prævia cases it is generally best not to operate until the parturient has been in labor for a certain number of hours. In common with others he has always

seen the wisdom of giving time for a reasonable test of labor in the border-line cases; but aside from these, it had formerly been his custom to operate at an appointed hour on the predicted date of labor. This plan has some obvious advantages: the patient enters hospital just long enough beforehand to be prepared properly; she is definitely told when the operation will be done, and is thus not kept in a state of uncertainty and possible worry; an hour is fixed to suit the convenience of the hospital and the operator, and to meet the advantage of a teaching clinic. Agreeable as these advantages are, however, to a well-ordered hospital, observation and experience have convinced the writer that they are relatively insignificant in comparison with the advantages to mothers and babies of deferring operation, except under emergency conditions, until the advent of labor and until labor has progressed for a reasonable number of hours. These advantages of operating after labor has been for a time in progress may briefly be stated as follows:

First. *It is certain that the gravida has reached full term.* It is a notorious fact that many women are never sure of their menstrual dates; and when the date of latest menstruation is positively known and recorded, it is not known when conception took place, whether shortly after the cessation of a given monthly period, or just before the time for the next one. The records of any experienced obstetrician show a not inconsiderable proportion of cases in which labor has supervened three weeks and one, two, or three days later than the date predicted from the latest menstruation. Abdominal Cesarean section is done largely in the interest of

the baby in elective operations, and it is a pity to deprive the baby of the last two or three weeks of intra-uterine development.

Second. *There is greater certainty that in the convalescence the uterus will have free drainage.* The writer has hitherto written and taught that when abdominal Cesarean section is performed before the advent of labor, the unobliterated cervix and undilated os uteri will generally relax and expand sufficiently to permit adequate lochial drainage. This he still thinks is generally true, but it is not invariably true; and the cases are not few in number in which the evidence of inadequate drainage makes post-partum dilatation of the cervix necessary. If the gravida who is to be delivered by abdominal section is allowed to labor until the cervix is taken up and the os uteri expanded to an inch or two, free drainage is assured, and the risks of lochial retention avoided.

Third. *There is less bleeding from the placental site.* Nature prevents bleeding by the process of retraction of the uterine muscular fibres: this process is a gradual one, beginning with the advent of labor; and it is reasonable to expect that when this process has gone on for several hours and the uterus is actively contracting, the placental sinuses will be more quickly closed than when the placenta is removed from a relatively flabby and inert uterus: experience justifies this expectation. Of course it is true that when incision is made and the baby quickly removed from the inert and non-contracting uterus, it will generally close down with reasonable promptness in strong, well-innervated women, and the bleeding may be inconsiderable; but experience seems to show that bleeding is much less, or even absent, when hysterotomy is done on the actively working uterus, in which muscular retraction has for a time been going on. No well-instructed third-year student would express the placenta after normal labor, in the absence of hemorrhage, until time had been allowed for adequate uterine retraction. Why, in the absence of conditions requiring it, should hysterotomy be performed before there has been time for at least a partial muscular retraction?

Fourth. *The uterine scar is stronger.* As far as the writer is aware there has been no animal experimentation bearing on this statement; but it stands to reason that the scar will be thicker and stronger if the closing sutures are applied to a uterine wall thickened by several hours of contractions, than when placed in the thin, comparatively flabby wall of a uterus incised before labor has begun. Indeed, in some of his repeated sections, performed after some hours of labor, the writer has found the general uterine wall much thickened, while the site of the scar is relatively much thinner. It is no wonder that those who, as a rule, perform gastro-hysterotomy before the advent of labor and therefore have resulting thin scars, believe that "once a Cesarean, always a Cesarean". Scars are likely to be thin and liable to rupture when the

closure is made on unretracted or insufficiently retracted uterine walls. But when the sutures are efficiently applied to a wall thickened by several hours of uterine activity, the resulting scar is as strong as, if not stronger than, the remainder of the uterus.

Fifth. *It is more certain that abdominal delivery is really necessary in the interest of mother, baby, or both, in the so-called border-line cases.* Every experienced obstetric surgeon will recall cases in which he had thought it probable, or even certain, that abdominal section would be necessary for safe delivery, which entered hospital and delivered themselves before the visiting surgeon could arrive. Some of these cases have had previous sections, but under changed conditions as to strength of pains and size of baby have delivered themselves. Humility is good for mortals, and it may as well be acknowledged that no man can say with certainty what any given woman may do in labor. Pelvimetry may be as accurate as skill and experience make possible; the size of the baby may be estimated with much exactitude; but no one can foretell what the character of the pains will be.

"It is a favorite procedure with some clinicians, in the border-line cases, to test the relative capacity of the pelvic brim by endeavoring to force the head into the pelvis by bimanual taxis. This method works very well in some cases; but it is generally painful, and its satisfactory performance often requires anesthesia. If the head can thus be made to pass the brim, well and good; but if it cannot, it is not proved that the head will not pass under the moulding of labor. To the writer it, therefore, seems a fairer test, in the border-line cases, to let the patient have a reasonable time, under observation, to show whether or not the head will mould into the pelvis. During this test, vaginal examinations should be avoided, and results be judged by external palpation," the third and fourth manœuvres, so-called, and by examination by rectum when necessary. "The fetal condition should also be watched, and the obstetrician should be in readiness to proceed to section with timeliness, if the test in a reasonable time does not indicate by gradual progress that safe delivery is likely to ensue".

There is another advantage of a reasonable test of labor in the border-line cases: some women, whose ante-partum study has made it seem to the observer measurably probable that safe delivery can be accomplished only by gastro-hysterotomy, demur at this operation, and it is well for the obstetrician to hesitate in urging surgery on the unwilling patient; but if the parturient realizes her failure in efficiency, under reasonable test of her powers, she is more likely to become a willing subject.

CASE 1. A young Russian secundigravida, who had aborted in her first pregnancy two years before, placed herself under the care and observation of the Hospital at the end of her seventh month. The

pelvis was of the justo minor type, with a true conjugate at the brim of 8 cm., and the inter-tubera ischii measurement was the same. Early in the last month the pelvis was explored under anesthesia; the baby was estimated to be of average size then, and had presumably three or four weeks to grow. The head was still floating, and no attempt was made to engage it. It was thought extremely probable that the case would come to abdominal section; still it was regarded as a border-line case, and when the young woman entered hospital at term, having been two hours in labor, she was allowed to go on eight hours longer, when the head was still not engaged and section was decided on: the baby weighed seven pounds and eleven ounces. The temperature was 100° F. on the evening of the tenth day, otherwise it was never above 99°; and mother and baby were discharged well on the twentieth day.

Comment. In contrast with this case, which came to Caesarean section, may profitably be mentioned a private case, a young American primigravida, a college graduate, with identical pelvimetry, but somewhat smaller baby, six pounds twelve ounces, which was safely delivered with forceps. Near the end of her second pregnancy it was evident that the baby was larger, and it was thought quite likely that it could not be delivered without injury through the 8 cm. justo minor pelvis; but the pains were excellent, and the young woman delivered herself, in a labor of twelve hours, of a baby weighing seven pounds twelve ounces. These two cases illustrate very well the sometimes forgotten fact that there are three factors in labor,—the power, as well as the passage and its passenger. In the former case the power was insufficient to mould and drive the head through the diminished pelvis: in the second labor of the latter case, with the same pelvimetry and with a baby one ounce heavier, the power was quite sufficient to overcome the same resistance. It is quite probable that in the former case the baby could have been delivered with high forceps, but with great likelihood of fatal compression and intra-cranial hemorrhage: it is in this type of case that Caesarean section has done so much for the conservation of fetal life.

CASE 2. An Irish sextigravida, aged thirty-six, after two early abortions, had been delivered in the Hospital of her first full-term baby in 1909: a high O.D.P. was rotated to an anterior position and high forceps delivery attempted; this failing, the baby, weighing eight pounds seven ounces, was delivered stillborn by internal podalic version. Eleven months after her discharge she re-entered in full-term labor, six hours after rupture of the membranes: no vaginal examination was made; but Caesarean section was performed on the strength of her former disaster, the baby weighing eight pounds. Two years later she again was admitted, having been in labor for over four hours: section was performed after labor for fifteen hours without progress, with no vaginal examination made, the baby weighing eight pounds fifteen ounces. A hernia through the former scar was repaired, and the woman was discharged in three weeks with no

evidence of hernia, and the baby weighing nine pounds ten ounces. Two and a half years later she first came under the writer's observation when she re-entered, thinking she was in full-term labor. The pelvis was found to be only slightly contracted antero-posteriorly, the obstetric conjugate being 9.5 cm.; but the woman was of the thickest, fleshy type, and her pains were very feeble. There was a considerable hernia in the lower third of the old scar. After observation for twenty-four hours, it was thought best, in view of the history and evident parturient inefficiency, and further in view of the considerable ventral hernia, to deliver by section. The baby was her smallest, weighing only seven pounds. Incision was through the old scar: the hernial sac was dissected out, and on discharge three weeks later, after an afebrile convalescence, the hernia was apparently corrected.

Comment. This woman's bony pelvis was only slightly contracted; but she was of the fat, flabby type with feeble musculature, and the indication for section was inefficient power, rather than relative disproportion between passage and passenger. It is quite possible that this baby, weighing seven pounds, could have been delivered safely by turning and extraction by the foot, although this procedure had failed with a baby weighing eight pounds seven ounces. But it was desirable that the ventral hernia should be repaired, and good judgment seemed to indicate section in the surer interest of both mother and baby.

The writer cannot help believing that ventral hernia after Caesarean section is generally attributable to hasty closure of the abdominal incision for a "time record". Except when the patient's condition is critical, which is seldom the case aside from the emergency conditions of toxæmia, hemorrhage, and cardiac disease, there is no necessity for haste in closing the abdominal incision. And when this incision is closed by layer suture, and the fascia in particular is carefully brought together and overlapped, hernia should be a rare sequel to Caesarean section.

CASE 3. An Italian quintigravida aged twenty-seven had had four difficult deliveries in other hands, and all the babies were stillborn. She applied at the Hospital two weeks before the calculated date for her fifth labor. The pelvis was carefully explored: the external measurements were normal, and the transverse of the outlet was 10 cm.; but the obstetric conjugate was found to be only 8 cm. The baby was thought to weigh not more than eight pounds. In view of the diminished conjugate, and especially of the disastrous obstetric history, it was decided to deliver by section, and this operation was performed at supposed term, for some unrecorded reason before labor supervened: the baby weighed seven pounds six ounces. After a normal, afebrile convalescence the woman was discharged well, and the baby three and a half ounces above its birth weight.

Comment. This case illustrates a fact which should be well known, that the normal external pelvic measurements of 28, 25, 20, do not neces-

sarily warrant a conclusion that the intra-pelvic measurements are normal. It also seems to point out that when a woman has lost several babies in birth, whether from inefficient *vis a tergo*, unrecognized pelvic contraction, or unskilful treatment in delivery, she is entitled to a fetus-saving operation which does not put her own life in serious jeopardy.

CASE 4. A negress of twenty-nine, primigravida, at supposedly full term, was referred to the Hospital from the Out-Patient Department for better observation on account of slight pelvic contraction. The pelvis was explored; but the contraction both in the conjugate at the brim and between the ischial tuberosities appeared to be only half a centimetre; the head, however, had not descended or even engaged, as it normally should have done, and the baby was thought to be not above average size; so it was deemed wise to let the woman take in labor and to observe results. At seven a.m. the next day pains were occurring every five minutes, and at eight-thirty a.m. the os uteri was an inch and a fourth dilated, the head being still not engaged. At two p.m. the head was still floating; but a rectal examination showed a large bag of waters reaching nearly to the pelvic floor, and indicating a probably full cervical dilatation. After another hour without progress, it was decided to proceed to section, and the baby, weighing seven pounds two ounces, was thus delivered after labor had continued for eight hours. The convalescence was complicated with cough, abdominal distention, and difficulty in moving the bowels; but the wound looked clean on removal of the stitches, and mother and baby went home well on the twenty-fourth day.

Comment. It might be said in criticism that if the membranes had been ruptured when the cervix was fully dilated the head might have moulded and descended, especially as it is a well recognized fact that the heads of negro babies are more plastic than those of the offspring of the white races. The writer can only reply that from his observation of the case and the character of the pains, this event seemed to him unlikely. Had the woman been a multipara with a history of safe delivery of an average-sized baby through the pelvis, the case would have been different. But the primipara is always an experiment, and the writer is chary of rupturing the membranes and expecting a primiparous head to mould and descend when it is still not engaged after eight hours of fair labor. Moreover, the development of a large bag of waters is good evidence that the head does not fit the brim effectively, as a good ball-valve.

CASE 5. A Russian primigravida of twenty-three took in labor at her home one week later than her expected date. Four and a half hours thereafter she was visited by two externe house-officers, both of whom examined vaginally and found the os dilated an inch and a half. Subsequently she was seen by an out-patient physician, who sent her into Hospital for better observation as a border-line case. The external pelvimetry was 27, 24, 18; the pelvis was not again explored vaginally. The head was high and not engaged; the baby was evidently not

over average size. It was decided the woman should have a further test of labor. Twenty-one hours after the beginning of labor, the pains being good and occurring every five minutes, there was still no engagement of the head, and the case was prepared for section. The baby weighed six pounds fifteen ounces. The convalescence was febrile: there was obvious intra-uterine sepsis, and consecutive phlebitis developed in the left and right leg; but the young woman recovered and was discharged on the thirty-ninth day, the baby being one pound over birth-weight.

Comment. It is not the custom of the writer's house service to examine vaginally to observe the progress of labor; but reliance is placed on external palpation, the third and fourth manœuvres, confirmed when necessary by examination *per rectum*.² In the case above outlined, however, two vaginal examinations were made before the patient entered the Hospital.

CASE 6. A Canadian secundigravida of twenty had been delivered of her first baby in 1912, having entered the Hospital after being in labor five hours with ruptured membranes. Section was performed by the physician then on duty on the indication of pelvic contraction, the baby weighing seven pounds. Mother and baby were discharged on the twentieth day. After going home, the mother had an attack of pleurisy, and was ailing for three months. Two years and four months thereafter she applied for care in her second labor, for which the calculated date was three weeks distant. She was a small, frail woman, had not been at all well during her pregnancy, suffered from backache and fainting spells, and was in a very unprepared condition to undergo even normal labor. The pelvis was generally contracted, with an obstetric conjugate of 8 cm.; the baby was estimated to weigh seven pounds, and the presenting head was not engaged. Seventeen days later she again visited the Hospital and was persuaded to remain for such ante-partum preparation as the brief time before labor was due would permit. The head was still not engaged, and it was clear that the baby was too large safely to pass the contracted brim; but it was decided that the mother should be allowed to await the advent of pains and remain in labor for a reasonable time, partially to dilate the cervix and to thicken the uterine wall. Labor supervened a week later than the calculated date, and was allowed to continue for ten hours, no vaginal examination being made. Incision was made to the left edge of the old scar, and in closing the abdomen the scar of the first operation was resected. The placenta was under the incision, and there was a considerable blood loss in the brief time before suture could be applied. The baby weighed seven and three-fourths pounds. The convalescence was afebrile; but there was much operative shock, and seepage was required. The mother was discharged obstetrically well on the twenty-first day, the baby being nine ounces above birth weight.

Comment. What "preparedness" to prevent or resist attack is to a nation is preparedness to undergo the stress of childbirth to a woman. The writer abstains from more than mentioning the subject in this paper; but he first wrote on the care and observation of pregnant women in

1891,' and has taught and written to this end ever since.' Until it is recognized by the profession and by the laity that women need preparation for labor as nations do for defense or actual warfare, obstetric results cannot be what they should be.

The writer once did a fifth Cesarean section on a woman who bore four abdominal scars. There seems to be no good reason why successive incisions should not be so made that former scars may be resected, and the woman be left with one scar, however numerous her sections may have been.

CASE 7. A Boston-born secundigravida of twenty-four had been delivered by section in 1912: she applied for care in her second labor two weeks before the calculated date. She was in excellent physical condition: the pelvis was contracted 2.5 cm. in all the external measurements, the true conjugate at the brim was 7.5 cm.: the baby was evidently above average size, and presented the shoulder left anterior, this mal-position obviously being due to the fact that the head could not find an engaging lodgment in the brim, and a breech presentation might well have resulted from the same cause. As directed, the young woman entered the Hospital on the date for labor, as calculated from the latest menstruation; but it was decided to await the advent of pains, not with any intention of giving a test of labor, but to afford the baby a chance for full development, and to secure a partial dilatation of the cervix, an active uterus, and a somewhat thickened wall. Labor did not begin until eighteen days after the calculated date, and section was performed after three hours of active pains, no vaginal examination being made. The incision was entirely above the umbilicus, by the side of the old scar, which was subsequently resected: the baby weighed eight and three-fourths pounds, and obviously could not have been delivered with safety through the pelvis. The convalescence was afebrile, and mother and baby were discharged on the eighteenth day.

Comment. There were two interesting incidents in this case: contrary to the rule there was a *left* lateral torsion of the uterus, so that the uterine incision was well to the right of the still visible scar from the first section; and the baby had an extensive pigmented hairy mole over the back and part of the abdomen, and scattered over the lower extremities, scalp, and forehead were brownish nevi varying in size from a pin-head to a silver dollar. The mother was advised to seek dermatological aid for the baby when it should be suitably developed.

CASE 8. An Austrian primigravida of forty was referred from the Pregnancy Clinic with mitral stenosis and regurgitation, and with beginning decompensation. She spoke no English and did not know her dates, but was apparently between the seventh and eighth months. There was some cough, and marked edema of legs and ankles. Four days later, under rest in bed and medical treatment, the lungs were clear, cough had disappeared, and the heart sounds showed much improvement; but there was still considerable visible edema. She

had a simple flat, non-rachitic pelvis, with an estimated obstetric conjugate at the brim of 8 cm., the span of the ischial tuberosities being 10 cm. The vagina and perineum were stiff and unyielding. After treatment for two weeks, compensation was restored, the heart sounds much improved, and the woman was discharged to the Pregnancy Clinic for continued occasional observation. Eighteen days later she re-entered the Hospital, thinking she was in labor, but proved not to be. The baby was much above average size, and the head was still floating. It had been decided earlier to deliver by abdominal section; but in view of the uncertainty as to when full term would be reached, operation was deferred until there should be definite evidence of labor. Meanwhile the woman remained in the Hospital, to her great general benefit. At one time it was found that the presentation had changed from head to breech; and five days later it had changed to head again. Labor began just three weeks after re-admission, and was allowed to continue without vaginal examination for three and a half hours, when section was performed with high abdominal incision: the baby weighed nine pounds three and a half ounces. The woman left the table with a pulse of 80, and made a smooth convalescence, the temperature never rising above 99.6°. Mother and baby were discharged on the nineteenth day.

Comment. There were three clear indications for section in this case: *first*, the pelvic contraction and large baby; *second*, elderly primiparity; even when there is no bony relative disproportion, there is much fetal risk in attempting to drag a baby with forceps through a pelvis with small, rigid vagina and perineum; *third*, the cardiac lesion; the short anesthesia of section is relatively much less of a tax on the disabled heart than a long first stage, probably followed with operative delivery through the pelvis.

CASE 9. A tall and apparently well developed secundigravida, whose first baby was stillborn after instrumental delivery in another hospital, applied for care at the Pregnancy Clinic six weeks before the second labor was expected: thence she was referred to the House on account of a contracted pelvic outlet. It was found that while the diameters at the brim were normal, the ischial tuberosities measured only 8.5 cm. apart, the baby being of average size: it was decided that delivery by section was indicated owing to the funnel pelvis and disastrous first labor. The woman entered at full term after eight hours' labor: no vaginal examination was made; the head was lightly engaged. After she had been in labor twelve hours section was performed by high incision: the baby, weighing seven pounds one ounce, had several supernumerary tragi, which were subsequently removed. The puerperal temperature reached 100° on the evening of the fifth and sixth days: the skin stitches were removed on the eleventh day. On the fifteenth day the temperature was 101°.4, and a redness was found around one stitch mark; this was dressed with creolin-wetted gauze and was soon well. There was, however, pain in the left leg: there was no evidence of phlebitis; but the knee was swollen and stiff, apparently from arthritis. The temperature was irregular for ten days, and there were

pain and tenderness in both knee joints: a gaultheria dressing was applied to both knees, and salicylate and bicarbonate of sodium were given internally. Seventeen days later the temperature had been normal for several days, the arthritis was improving, and the sodium salts were omitted. The next day, after six days of normal temperature, the patient had an attack of dyspnea lasting half an hour, the pulse and temperature being unaffected. The following day the woman sat in a chair for half an hour and appeared in good condition. In the evening the nurse noticed difficult breathing, and the house officer found a rapid, poor pulse and shallow respiration: the patient rallied under treatment, but suddenly had a convulsion, and died, apparently from embolism. No necropsy could be obtained. The baby was discharged well.

Comment. It is one thing for a baby to enter the pelvis and another thing for it to make a safe exit. The funnel pelvis is not a common, but an occasional deformity; and forceps delivery with undue force is likely to result in unsafe cerebral compression and consequent intra-cranial hemorrhage. There is no question that section is indicated, in the interest of the baby, in cases of marked contraction of the pelvic outlet.

CASE 10. A Russian secund. avida of twenty-eight had lost her first baby in instrumental labor in Russia. When apparently at the beginning of the ninth month, having no knowledge of her menstrual dates, she was referred from the Pregnancy Clinic on account of pelvic contraction. The pelvis was just minor with an obstetric conjugate of 7.5 cm., the average sized baby presenting Sc.L.A. After the usual pregnancy care she entered the Hospital, having been in active labor for twelve hours. The position was still oblique with shoulder presenting; and the os uteri was thought probably to be fully dilated, inasmuch as the unruptured bag of waters presented at the vaginal introitus. She was delivered by high incision of a baby weighing six and a half pounds. In view of the fact that the fetal membranes had partially been pushed down through the unprepared vagina, it was thought unwise to deliver them through the uterine incision: the entire secundines were therefore pushed down into the vagina with two gauze strips, and subsequently delivered from below. After a normal convalescence, mother and baby were discharged, well, on the seventeenth day.

Comment. The writer believes that prior to abdominal section, or other obstetric procedure for that matter, the vagina should be cleansed with gauze, soap and water, followed with sterile water irrigation, as for a vaginal plastic operation. But in many hospital cases this is impossible: it is not well, however, to deliver through the uterus membranes which have been withdrawn from the unprepared and perhaps already infected vagina; it is easy enough, with a sterile gauze strip, thus not contaminating the rubber glove, to push the separated placenta and membranes into the vagina, whence they can be removed from below after the abdomen is closed. In this connection the writer would like to express his belief in the wisdom of taking

time and pains in the complete separation and removal of the membranes before the uterine sutures are applied. This is best done by evert ing the uterus through the incision or turning it inside out, one-half at a time; by this procedure the intra-uterine surface can be sponged visibly clean with gauze; this technique was followed in all this series of cases.

CASE 11. An Irish secundigravida of thirty-two was delivered instrumentally of her first baby, weighing ten and one-half pounds, in another hospital: the baby died in four days of intra-cranial hemorrhage. In the fifth month of her second pregnancy she applied for care at the Boston Lying-in Hospital. Pelvimetry seemed to show no contraction or deformity; of course it was too early to judge what the size of the baby would be at term, but it was not thought that abdominal section would be necessary. The writer did not see the patient again until she entered in labor, eighteen days after the date calculated from the latest catamenia. She had had pains for five hours: the baby was found to be much above average size, but surely not weighing as much as the first; the presenting head was in O.D.P. position, and not engaged. Naturally the woman was very anxious for a living baby after her primiparous misfortune, and was entirely willing to submit to section, if it were thought necessary. It was decided to subject the case to a reasonable test of labor without vaginal examinations. Eight and a half hours later the pains continued regular and of good strength, occurring every five minutes; but the fetal head was still floating, and the patient was prepared for section. The baby was delivered through a high abdominal incision, and weighed eight pounds and thirteen ounces: the mother left the table with a pulse of 90; her post-partum temperature never reached 100°, and she was discharged, well, on the sixteenth day, the baby weighing nine pounds three ounces.

Comment. The necessity for abdominal section in this case may perhaps be questioned. In earlier days, before the Cesarean operation was as safe as it is now, anterior rotation of the occiput with the hand, followed with high forceps, would have been resorted to, or perhaps internal podalic version, and the result might have been all that could be desired. But there were two good reasons, in this case, for choosing gastro-hysterotomy: in the first place, although the pelvis was apparently of normal capacity, the head of the baby weighing less than nine pounds, did not engage after some fifteen hours of good multiparous labor, whether from undue thickness of soft parts or of pelvic bones is not clear; secondly, the maternal instinctive desire for a baby which would survive operative delivery. No obstetrician, however skilful and well trained, likes to take chances under these circumstances. A hospital patient, who had already had three Cesarean sections, was once informed by the writer that he thought he could deliver her safely of her fourth baby through the pelvis by podalic version; but when, in reply to inquiry, he naturally said he was not sure,

the woman chose to be delivered by section, and the writer subsequently delivered her in the same way of her fifth baby.

CASE 12. A Newfoundland woman of thirty-seven in her seventeen years of married life had had eight normal deliveries. When supposedly five months advanced in her ninth pregnancy, she applied at the Pregnancy Clinic giving a history of having had, three years before, the following series of operations: trachelorrhaphy, colpo-perineorrhaphy with closure of the anal sphincter, appendectomy, closure of diastased rectus muscles, and ventral suspension(?). She was followed in the Clinic, and it was possible to appreciate by bimanual examination the thickened anterior wall of the lower uterine segment which had physiologically hypertrophied but could not expand in the latter half of pregnancy on account of its firm, broad attachment to the abdominal wall; the latter was very tense, thick, and boardlike from the operation for ventral hernia, and it was impossible to palpate the fetus through it. She entered in labor ten hours after pains began, but the pains were of poor quality. A single vaginal examination was made: the cervix could not be reached, owing to the extreme anteversion of the uterus, nor could a presenting part be pushed over the brim from above; anteriorly the lower uterine segment felt much thickened. After supra-umbilical incision the partially adherent veil of omentum was tied off and pushed aside. There was a broad, fibrous band running from the lower anterior abdominal wall to the anterior surface of the uterine body, which so far anteverted the uterus that the incision was largely in the much thinned posterior wall. The baby weighed eight and one-half pounds. The broad fibrous band was not interfered with. After a normal convalescence the mother was discharged with her baby on the eighteenth day.

Comment. Delivery through the pelvis would have been impossible in this case unless by jeopardizing the mother and probably losing the baby. Perhaps no further comment is worth while; but it is fair to state that the series of operations to which this matron of thirty-seven was subjected could not have been performed by a surgeon of good obstetric training and judgment. The risks of utero-ventral fixation to women still in the childbearing period are well known to obstetricians, and should be well known to all who do abdominal surgery on women. There are many expedients by which the discomforts from a procident uterus can be alleviated until such time as a woman is not reasonably likely to become pregnant again; and after her puerperal voyage is over, she can then safely and effectually be put in gynecological good order.

CASE 13. A Russian tertigravida of twenty-nine lost her first baby, weighing seven pounds thirteen ounces, from undue cerebral compression in high forceps delivery: she was advised by her attendant to have section performed the next time. Her second pregnancy, beginning a few months later, was followed in the Pregnancy Clinic, and the woman entered the Hospital in good condition five hours after labor began. The pelvis was simple flat non-

rachitic, with an obstetric conjugate of 8 cm. After she had been in labor ten hours in all, with good pains, the os was fully dilated; but there was no descent of the presenting head, and section was performed by the surgeon on duty, the baby weighing ten ounces more than the first. There was some infection of the abdominal incision. When mother and baby were discharged the scar seemed well healed; but hernia subsequently developed. Two years later the woman again applied in early pregnancy and was followed in the Clinic: there was a large hernia through the lower half of the old scar, and a smaller one at the level of the umbilicus. When she entered after five hours of labor she was allowed to go on five hours longer before the second section was performed. The baby weighed seven pounds fifteen ounces. The old scar was resected, the hernial sacs dissected free and tied off, and when mother and baby were discharged on the nineteenth day the incision was apparently solid. A month later two small superficial sinuses appeared, but closed after the emission of a catgut suture.

Comment. It is fair to say that in some thin, stretched out, multiparous abdominal walls it is very difficult to differentiate the layers, and in closing them the operator can do only the best he can. But the writer believes that hernia can almost always be avoided, if time is taken to do a painstaking closure layer by layer when possible. For some years he has overlapped the fascia and applied a mattress suture of No. 2 catgut. One of the reasons why some operators prefer the supra-umbilical incision is that there is less risk of post-operative hernia, because the weight of the abdominal contents is chiefly borne by the infra-umbilical wall. Since he last wrote on this subject the writer has changed his opinion, and now believes that except when there is some new growth or other condition requiring easy access to the pelvis, the supra-umbilical incision is on the whole preferable.

CASE 14. A small, poorly developed woman of twenty, who had early aborted her first conception, entered in her first full-term labor, with rather feeble pains. She had not been in the Clinic and had had no ante-partum preparation whatever. Examination by rectum showed that the cervix was not obliterated. The external pelvimetry was 23.5, 20.5, 16.5 cm.: the baby was small, and the presenting head was not engaged. The pains became more active, and labor was allowed to proceed for thirteen hours, the head meanwhile not engaging, when a five-pound baby was delivered by high incision. There was a moderately febrile puerperium for the first ten days; but the young mother was discharged well, on the eighteenth day, with the baby above birth weight.

Comment. It is always a pity when there is no opportunity for careful ante-partum study of the pregnant woman. In the above case the indication for section was clear enough from the pelvimetry and non-engagement of the small head. But aside from the value of general preparation and supervision during pregnancy, the obstetrician can do his best work when he is permitted to study his case beforehand in a series of observations.

CASE 15. A Russian primigravida of twenty-four applied six weeks before full term, and there was time for a careful study of the case. The pelvis was of the generally contracted, flat, rachitic type, with marked lumbar lordosis: the obstetric conjugate was 7.5 cm., the transverse of the outlet, 9.5 cm. Although the baby was palpated to be below average weight, it was thought that delivery by section would be necessary. When the woman entered in labor she had had pains for five and a half hours; but the cervix was not taken up and the head was movable at the brim. Labor was allowed to continue six hours longer, eleven and a half hours in all, to dilate the cervix to some extent, and to thicken the uterine wall, when, the head being still not engaged, a six and three-fourths pound baby was delivered by high incision. The post-partum temperature was normal on the evening of the second day, and thereafter never rose above 98°. Mother and baby were discharged, well, on the sixteenth day.

Comment. In none of this series of cases was the uterus everted before the baby was delivered; indeed, the writer has long since given up this earlier technique. He has also discarded the rubber dam of former days. It is easy to protect the peritoneal cavity by placing a long, moist, gauze strip, and after the uterus is emptied it is simply lifted through the short incision for the better inspection and sponging of the mucosa and application of the two layers of sutures.

CASE 16. A Russian primigravida of twenty was sent in from the Out-Patient Department after twelve hours of labor, with the presenting head of an average-sized baby still not engaged at the brim. She had had no ante-partum study or pregnancy care. The pelvis was just minor, but the contraction was slight. Examination by rectum showed the cervix taken up, two inches dilated, and the membranes not ruptured. Section was performed on the indication of minor pelvic contraction and the non-engagement of the head after twelve hours of good labor. The seven pound one ounce baby was delivered through supra-umbilical incision, and the uterus sponged clean. During the night there was a smart secondary hemorrhage, with subsequent elevation of pulse and temperature; but after the fifth day the convalescence was smooth, and mother and baby were discharged, well, on the sixteenth day.

Comment. It is quite possible that this baby might have been delivered safely by podalic version; high forceps was not to be thought of on a non-engaged, un moulded head, even if in anterior position, and the writer thought it wiser not to take the chances of version and extraction for the baby. It is possible, too, that if the woman had been allowed to go six to twelve hours longer in labor the head might have moulded through the brim; but if it should not have done so, and section were then performed, the prognosis for the mother would have been less favorable. One hesitates, in these cases of minor relative disproportion, to deliver by section when the patient has been examined vaginally with doubtful asepsis, and the fact that

there has been such examination is likely to influence the obstetrician to take chances with the baby rather than with the mother. After all, each case must be decided in accordance with the training, experience, and judgment of the responsible doctor or of his consultant.

CASE 17. An American primigravida of twenty-three, in the care of the Pregnancy Clinic, was referred to the House two weeks before the calculated date of labor on account of moderate pelvic contraction and non-engagement of the fetal head. The pelvis was found to be just minor, with an obstetric conjugate of 8 cm.: the case was put on file to await developments. The woman entered on the expected date, not in labor; but four and a half hours later labor began, with pains every five minutes. Labor was observed for six hours, and as the head did not engage, section was performed by high incision, and the baby, weighing seven and three-fourths pounds, delivered. It was then found, with surprise, that the placenta was *prævia* with marginal attachment: there had been no bleeding during pregnancy nor during the six hours of labor, and nothing that would suggest the possibility of a *prævia*, unless it were that the head did not engage; of course the ectopic placenta does sometimes interfere with engagement, but in this case the pelvic contraction was sufficient to prevent the head of a seven and three-fourths pound baby from settling into the brim.

After the removal of the placenta there was considerable bleeding, and the pulse became rapid and of poor quality. The condition improved under heaters and blankets, with salt solution under the breasts and by rectal seepage; but seven hours later the patient was restless, the pulse 140 and feeble. She improved during the day, but in the late afternoon again bled profusely, with large clots, rapid pulse, and shallow respiration: under treatment with salt solution, morphia, caffeine, and subcutaneous ergot she again improved and there was no more bleeding. Uterine sepsis ensued, with definite spasm and tenderness in both lower quadrants, and with relaxed, tender uterus: later there was a purulent discharge from the uterus, containing a piece of catgut; but under treatment with ergot, ice to the abdomen, and Fowler's position the woman made a good recovery and was discharged with her baby above birth-weight on the twenty-fourth day.

Comment. This case illustrates very well the two great dangers of ectopic placentation,—hemorrhage and infection, and these dangers are ever present by whichever route delivery is effected. The reason seems to lie in the fact that the uterus retracts much less effectively in the lower segment below the contraction ring; and when the placenta is seated wholly or in part in the lower segment, the sinuses, less well closed by muscular retraction, must be closed by thrombosis. The soft, friable thrombi are easily displaced by coughing, sneezing, any bodily movement, or even by the venous blood stream, and, furthermore, are good culture media should infection be introduced.

It is not the writer's purpose in this paper to give his views on the treatment of placenta *prævia*: reference is made to what he has recently written on this subject; but he would express

the opinion that there is no one treatment for this unfortunate and always dangerous complication, the course to be followed must be decided in each case according to its conditions. One disadvantage in the delivery by section when the placenta is *prævia* is that one hesitates to pack the bleeding uterus: to be effective against hemorrhage the intra-uterine pack must be applied very firmly; what effect such a firm, tight packing would have on the uterine sutures, the writer has never learned by experience. If the writer had known that the placenta was *prævia* in the above reported case, he would have elected to deliver by section, as he did do, because of the pelvic contraction, because the patient was a primigravida, and because there was a good-sized baby in good condition at full term; and however delivery is effected, unless the fetal life is disregarded, there is and always will be a considerable jeopardy to the mother.

CASE 18. An American primigravida of twenty applied for care three weeks before the calculated date of labor. The pelvis was just minor with an obstetric conjugate of 8.5 cm. The baby was not above average size, and the presenting head was not engaged. It was regarded as a border-line case. The young woman entered ten days after the date, having been in labor eight hours: the head was still not engaged. Labor was observed for eight hours, partly to see whether the head would engage, and partly to dilate the cervix and thicken the uterine wall in case section should be found advisable. After a labor of sixteen hours in all, the head still floating, the baby, weighing half an ounce over seven pounds, was delivered by high incision: the mother left the table with a pulse of 90, and after an afebrile convalescence went home with the baby, on the twenty-second day.

Comment. If this baby had been delivered on the predicted date of labor, it would have lost, as it proved, ten days of intra-uterine development: under the rules of fetal growth this would have amounted to ten ounces,—surely an adequate reason, in the absence of maternal emergency, for deferring section until labor begins. It may be said in objection to delaying section after labor has once begun that the maternal prognosis is less good, that the fatigue of some hours of labor will injuriously diminish the parturient's strength and resistance to infection. Such, however, is not the writer's experience; and it should be remembered that the effect of the labor on both mother and baby should be closely watched when section is thus deferred, and vaginal examinations abstained from.

CASE 19. An American primigravida of nineteen applied at the Pregnancy Clinic when six months advanced, and thereafter the welfare of the mother and development of the baby were regularly studied. The pelvis, like that of so many American young women, was undeveloped and generally contracted: the obstetric conjugate was 7.5 cm., or 3 inches. Unless with a very small baby, this conjugate might well be accepted as an absolute indication for section; but it was decided to

give a reasonable time in labor, not so much with an expectation that the floating head would engage, but for the other reasons already dwelt upon. When the young woman entered the Hospital at the calculated date, labor had been in progress for two hours, and she was observed three to four hours longer. It was then not believed that the head would enter the pelvis, and it was thought that there was a sufficient cervical dilatation and thickening of the wall. The baby, weighing six and seven-eighths pounds, was delivered by high incision, and the post-partum maternal pulse was 100. There was some fever in the first six days, but the convalescence was afebrile thereafter, and the mother and baby were discharged, well, on the twenty-fourth day.

Comment. It has been a matter of congratulation in this country that our young women were not exposed to working conditions which in Europe so frequently result in the so-called occupational deformity of simple flat non-rachitic pelvis; but so far as childbearing is concerned, the justo-minor pelvis of imperfect development, so often observed in young American wives, high and low, rich and poor, is quite as productive of pathologic labor. Sometime, perhaps, the physical development of our young women will be more carefully supervised, as we advance in socialism; and perhaps young women of seventeen to twenty will be advised not to marry until they have endeavored to reach full physical development. In the meantime, there may be some measure of gratitude felt towards those of the medical profession who have made it possible for imperfectly developed women to have a family of children by the now comparatively safe procedure of Cesarean section.

CASE 20. An Italian nonigravida of thirty-three came to the Hospital and through an interpreter implored that she might have a Cesarean section, the nature of which she seemed to understand, and, indeed, she pointed with her finger where she would be cut. The history was that she had had eight children, all delivered *per pelvim*, and all stillborn: she begged for a living child. She was four feet eight inches tall; the pelvis was of the simple flat rachitic type, with an obstetric conjugate of 7.5 cm.; the span of the ischial tuberosities was 10.5 cm. The unfortunate woman was assured that she would be delivered by section at full term. She did not enter hospital, for some unknown reason, until she had been in labor for more than thirteen hours: section was performed by high incision four hours later, the baby weighing seven and three-fourths pounds; she left the table in excellent condition. There had been no adequate bowel preparation, and for several days there was considerable distention; but this was relieved on the third day by a very large defecation. There was some infection of the incision, without affecting the temperature; but the happy woman went home with her baby on the twenty-seventh day.

Comment. There was an absolute indication for section in this case in the degree of pelvic deformity; but if the pelvis had been normal, as far as pelvimetry could determine, a humane

medical attendant would have seen a clear indication in the series of obstetric disasters which the unfortunate woman had suffered. As soon as the mother was out of either her baby was, by direction, placed in her arms. It is not difficult to understand the unspeakable joy it is to a woman, especially when former labors have resulted disastrously, to take to herself her first living baby; and she should be given this great happiness before, perchance, the baby should succumb, as it does occasionally, to some irremediable congenital defect, or indeed before the mother herself should sustain a fatal embolism or other puerperal catastrophe.

Summary. Of the twenty cases outlined above one mother died of embolism. There was no fatal loss. From his present knowledge and experience the writer would emphasize the following conclusions:

1. Every pregnant woman should receive painstaking ante-partum study and adequate general care, to the end that the obstetrician may understand the conditions with which he will have to deal, and the mother may be in the best possible physical condition for what she is to undergo.
2. Except under emergency conditions section should be deferred until the advent of labor and until labor has progressed under observation for a reasonable number of hours,—this not only in border-line cases, in which a test of labor is desired, but also when the indication for section is absolute.
3. During the observation of labor vaginal examinations should be avoided, and progress noted by external and rectal palpation.
4. The vagina should be prepared before Caesarean section, whenever possible, the same as for any surgical procedure in or through the vagina: this should be done with gentleness and care so as not to traumatize the mucosa.
5. Except when easy access to the pelvis is necessary, the supra-umbilical incision is preferable.
6. There is no reason for eventration of the undelivered uterus.
7. The uterine wall should be painstakingly sponged clean of membranes and clot before its closure: this can readily be done by sight by inverting the uterus, half at a time, through the uterine incision.
8. When the membranes have more or less descended into the vagina, it is safer to push the placenta and remaining membranes down and deliver them from below, than to remove them through the uterine incision.
9. The uterine wall, thickened by some hours of muscular retraction, should carefully be closed with deep and sero-serous absorbable sutures.
10. Time should be taken for a triple-layer suture of the abdominal wall, especial care being used with the fascia, which is best closed with overlapping and mattress-stitch.

11. The uterus was created a movable organ: it should be allowed to remain so, in married women, until after the climacteric.

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- ¹ BOSTON MEDICAL AND SURGICAL JOURNAL, Vol. cxi, No. 22, December 2, 1909.
- ² Case Histories in Diseases of Women, p. 241.
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- ⁴ BOSTON MEDICAL AND SURGICAL JOURNAL, February 25, 1892.
- ⁵ Ohio State Medical Journal, August 15, 1911. Prospective Motherhood: Health-Education League, Boston, 1914.
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MODERN INDICATIONS FOR CAESAREAN SECTION.*

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(This paper will be confined to the mechanical indications for Caesarean section, in order to keep within normal limits of time and space.)

I BELIEVE that it may be assumed that the aim of successful obstetrics is to secure 100% of living mothers and 100% of living children. To go still further, no obstetric case can be considered to have resulted with perfect success when the mother is left in a state of invalidism, or permanent injury has been done to the child. It is, perhaps, too much to expect that the practice of obstetrics will ever quite reach this ideal state; nevertheless, it should be our constant endeavor to approximate it.

Probably no branch of medicine or surgery has been more hampered with mediaeval superstition than obstetrics. Of the obsolete traditions whose influence is still felt, two may be singled out as particularly pernicious.

The first of these is the teaching that 95% or more of all cases of labor will terminate spontaneously if left to nature.

The second is that the hard high intrapelvic operations, while having a considerable fetal mortality, are without danger to the mother.

I shall not take up your time to discuss the first of these superstitions. The experience of every practitioner has refuted it. It does not seem to be so generally understood, however, that the difficult intrapelvic deliveries have a maternal as well as a fetal mortality, and, as I shall show, that this mortality is essentially as great as that of early Caesarean section.

It has been extremely difficult to find honest statistics in the literature, but after much search I have collected a few, which are presented in the first chart.

* Read before the Chirurgical Society of Boston, April 23, 1915.

INTRAPELVIC OPERATIONS.

CHART I.

Author.	Cases.	Maternal Deaths.	Fetal Deaths.
Lipsky ¹ (Moscow, 1899-1912)...	225	2	—
Leopold ² (Dresden).....	773	20	215
Gans ³ (Königsberg).....	562	4	—
Zernicke ⁴ (Breslau, 1902-1907)	396	2	16
Peham ⁵ (Vienna).....	244	2	—
Edgar ⁶ (New York).....	252	0	25
Nebesky ⁷ (Innsbruck).....	362	3	27
Susanow ⁸ (Moscow).....	222	4	63
Total.....	2930	37	346

Maternal mortality..... 1.2%

Fœtal mortality..... 17.2%

I have edited these statistics and excluded all deaths from eclampsia, placenta prævia and extra-pelvic conditions, reducing the causes of maternal death to shock, hemorrhage, infection, rupture of the uterus and pulmonary embolism. The mortality (1.2%) represents the results in some of the best obstetric clinics in the world. The average fetal mortality in these same clinics is 17.2%; and this does not include the paralytics, the idiots and the epileptics resulting from these deliveries. If in good hands the maternal mortality is 1.2% and the fetal 17.2%, one can only conjecture what these will rise to in the hands of poorly trained practitioners.

The destructive operations, as one would expect, present a still higher mortality. Pinard⁹ and Bar¹⁰ in Paris, Hannes¹¹ in Breslau, and Gushee¹² in New York, give the mortality as 11.5%, 9.39%, 5.1% and 11.4% respectively. It may be argued that these statistics run back into prehistoric times, but fortunately one has to go back a considerable distance to get together statistics on craniotomy.

Now as to Caesarean section, Reynolds¹³ in 1907 collected all the Caesarean sections performed during the preceding ten years by obstetricians who had done at least five operations. He classified them under three headings:—

1. Primary.
2. Secondary.
3. Late.

He classified as *Primary Caesarean Sections* all those done before the onset of labor;

As *Secondary Caesarean Sections*, those done early in the first stage; and

As *Late Caesarean Sections* those done after six hours of strong pains, or where the os was dilated more than the size of a half-dollar.

There were 82 primary operations with 1 death, a mortality of 1.2%; 158 secondary with 6 deaths, or 3.7% mortality; and 49 late with 6 deaths, 12.2% mortality.

From these results, Reynolds argued that the primary Caesarean section was a very safe procedure, the late Caesarean a very dangerous procedure, and that the test of labor in doubt-

ful cases should be abandoned, and either Caesarean section done before the onset of labor or the patient allowed to go on to a spontaneous delivery or a craniotomy.

With the first two of his conclusions there can be no difference of opinion. That so far as possible Caesarean sections should be done before the onset of labor is desirable for many reasons, but that Caesarean section after labor has begun should be discarded, I cannot agree.

In the first place, given a clean patient, under clean conditions, handled with strict asepsis from the start of labor, and with unruptured membranes, there is no good reason why a few hours of labor pains, or one or two vaginal examinations should increase the mortality.

Second, while the pelvis can be measured, the size of the baby estimated, and the relation of the head to the brim determined before labor, there are still a few important factors which cannot be foretold. These are the exact date of labor, the amount of moulding and degree of ossification of the head, the resistance of the soft parts and the way the uterus is going to act.

In the Dresden¹⁴ clinic, in 6,865 contracted pelves, spontaneous delivery or low forceps terminated labor in 88%.

in Breslau ¹⁵	64.2%
in Tübingen ¹⁶	81. %
in Baltimore ¹⁷	75-80. %
in Bonn ¹⁸	66. %
in Vienna (Chrobak) ¹⁹	54.5%
in Vienna (Braun) ²⁰	37. %

Most of us remember patients who, after a hard operative delivery with perhaps loss of the baby in the first pregnancy, have had a rapid normal labor with the second.

It seems to me more practical to divide Caesareans into two classes rather than three, that is to say, uniting Reynolds' primary and secondary operations in one group, which I should call early, and including all patients operated on before twelve hours of labor. Those operated on after this time or after attempts at delivery have been made I should classify as late Caesarean sections. With these last, however, it is not my intention to deal.

The recent literature of Caesarean section is enormous, and it would be a stupendous task to cover it. I have collected from the literature, going through only the more important journals for the past few years, all series of ten cases or over reported by the same operator or from the same clinic, excluding as far as possible all except early Caesarean sections. Large series of operations are often reported in such meagre detail that undoubtedly some late Caesarean sections have been included in this list.

In 846 cases of early Caesarean section there were 14 deaths, a mortality of 1.6%, which is approximately as low as Reynolds' figure for primary Caesarean section and one per cent. lower than the mortality for early Caesarean sections made by combining groups one and two

CAESAREAN SECTION.
CHART II.

Author.	Cases.	Deaths.
Richter ²¹	107	0
E. P. Davis ²²	103	1
A. B. Davis ²³	129	4
Kouwer ²⁴	60	1
Fischer ²⁵	60	1
Green ²⁶	60	1
Boyd ²⁷	48	0
Humpstone ²⁸	25	0
Shäfer ²⁹	50	2
De Lee ³⁰	49	2
Fenton ³¹	25	0
Good ³²	20	0
Ward ³³	28	0
Brown ³⁴	27	0
Rachmanow ³⁵	30	2
Prince ³⁶	8	0
Warren ³⁷	6	0
Williams ³⁸	14	0
Total	849	14

Maternal mortality 1.6%

of his paper, thus showing that our results are constantly improving.

Another large group of statistics appearing in the literature is that collected by Routh,³⁹ of 1,282 Caesarean sections by British operators. Of these there were 469 early cases, with 14 deaths, a mortality of 2.9%. I have not included these cases with my statistics, because they represent the work of 100 different operators, extending back over a period of nearly forty years.

The mortality from Caesarean section is still too high, but I believe will continue to improve. The statistics I have given were in large part collected from hospital clinics. Now it is a matter of observation that hospital patients stand laparotomies worse and difficult operative deliveries better than private patients. The reason for this is obvious. The greater cleanliness of the private patient, and the better physique and endurance of the hospital patient are satisfactory explanations. Therefore, figures collected entirely from private practice would undoubtedly be even more favorable to Caesarean section.

Two other procedures which have been devised for use in border-line cases remain to be discussed:—

Pubiotomy, and

Extraperitoneal Caesarean section.

Pubiotomy has never been received with enthusiasm in this country, and certainly cannot be considered as a competitor with Caesarean section performed in advance of labor. Its disadvantages are obvious. Its field of application is limited to pelves whose conjugata vera is over 7 c.m., rendering it useless in pelves of marked contraction. It is a mutilating operation. Deep tears of the soft parts, and bladder

injury, are common. It does not infallibly, accident excepted, guarantee a living baby as does Caesarean section. Its technic is difficult, requiring many assistants, constant guarding against injury of soft parts and contiguous organs, and a much greater degree of obstetrical skill than does Caesarean section. It cannot be performed until after some hours of labor, as the cervix and birth canal must be partly softened up before delivery can be undertaken.

All writers agree that pubiotomy is contra-indicated in the presence of infection, and is, therefore, ruled out in late cases.

Finally, the actual results of pubiotomy have not been as good as those of early Caesarean section, as shown in the accompanying chart. Pubiotomy has a mortality of 2.6% as compared with 1.6% for early Caesarean section.

PUBIOTOMY.
CHART III.

Author.	Cases.	Deaths.
Roth ⁴⁰	85	2
Van de Velde ⁴¹	40	1
Jellet ⁴²	19	0
Harbleicher ⁴³	16	0
Freeland ⁴⁴	9	0
Jacobson ⁴⁵ (All American cases) ...	53	3
Total	222	6

Maternal mortality 2.6%

The extraperitoneal Caesarean section is still on trial. There are, according to Nicholson,⁴⁶ some twenty modifications of this operation. Space forbids us to discuss these in detail, but for practical purposes they may be divided into transperitoneal and true extraperitoneal Caesarean sections. The chief examples of the former are the operations of Frank, Sellheim, and Veit and Fromme. While differing in details of technic, the general principle is the same in all. The peritoneal cavity is opened. The uterine peritoneum is incised and stripped off the anterior face of the uterus and united to the cut edges of the parietal peritoneum either by suture or clamps, thus excluding the peritoneal cavity before opening the uterus.

Of the true extraperitoneal types of operation, those of Doederlein and Latzko are the best known. In these the peritoneum is not opened, but is dissected upward, after a low incision is made through the other layers of the abdominal wall, and access to the uterus is obtained through the parametrial tissues. The disadvantages of this type of operation are many.

1. Difficulty of technic.

2. It exposes the parametrial tissues to infection and contraindicates the operation in late cases.

3. Injury of the bladder, and opening the peritoneal cavity are common.

Since the operation affords no advantages over the classical Caesarean section in early cases, and is contraindicated in the late cases where the classical Caesarean is also contraindicated, it is evident that the true extraperitoneal Caesarean is not of much value.

My experience with extraperitoneal Caesarean section has been limited to one case done by the transperitoneal method,—unfortunate in its outcome, but particularly instructive. This patient, a primipara with an absolute Caesarean pelvis, entered the City Hospital last February, not in labor, and with a completely detached normally situated placenta. Under these conditions Caesarean section seemed the only possible method of delivery, and as I knew nothing about the previous handling of the patient, I chose the extraperitoneal method. A low median incision was made and the peritoneal cavity opened. The uterine peritoneum was incised transversely just above the bladder reflex and stripped off the anterior face of the uterus upward for a distance of about five inches, and the edges of the uterine united to the edges of the parietal peritoneum by a continuous catgut suture. The peritoneum thus being excluded, the uterus was incised in the median line and the child delivered by forceps. Closure of the uterine wound and abdominal wall by interrupted suture, in layers, with drainage of pre-uterine space.

The patient unfortunately died of embolic pneumonia on the fourth day, which gave us, however, an opportunity to investigate post-mortem the technical success or failure of our operation. Although the patient's condition had been so poor that the union of the peritoneum of uterus and abdominal wall had been done hastily, the entire operation occupying less than twenty minutes, and although there had been free bleeding on opening the uterus, not a single clot nor a bit of excess fluid was found in the peritoneal cavity post mortem. This proves that, anatomically, at least, the operation presents some possibilities for use in infected cases.

EXTRAPERITONEAL CAESAREAN SECTION.

CHART IV.

Author.	Cases.	Deaths.
Küstner ²¹	100	2
Welbel ²²	67	2
Baum ²³	26	1
Balsch ²⁴	50	1
Richter ²⁵	12	1
Total	255	9

Maternal mortality 3.5%

Now as to results,—255 cases with 9 deaths, a mortality of 3.5%, which, considering that many of these were in late and infected cases, is

good. The description of technic in most instances was so hazy that I have not tried to separate the various types of operation in this table, but have put them all together.

My position in regard to the management of labor in contracted pelvis is as follows:—

In marked cases of pelvic contraction and cases of marked disproportion between the head and the pelvic brim, Caesarean section should be done before the onset of labor.

All primiparae where the head is high at the end of pregnancy, whether or not there seems to be any disproportion between the head and the brim, and even if the pelvic measurements are normal, should be regarded as possible candidates for Caesarean section until a few hours of labor have demonstrated whether the uterus can drive the head through the brim.

High forceps and version are unjustifiable operations in the primipara at term, being no safer for the mother than early Caesarean section, and having a fetal mortality of over 17%, besides permanent injuries to the brain and nervous system.

Pubiotomy is a complicated and difficult operation, having a very limited field of application, and even in this field produces no better results than Caesarean section.

The extraperitoneal Caesarean section of the transperitoneal type offers a possible advance in our methods of handling late and infected cases.

I wish to mention two other indications for Caesarean section:—

1. High abnormal presentations in the primipara.
2. Late primiparity.

1. Under high abnormal presentations I should include the high breech, high face and transverse in the primipara. What I have said in another paper²⁶ regarding Caesarean section for primiparous breech it appears to me applies equally to the other abnormal positions.

"The existence of one of these presentations in a primipara always means some disproportion between the fetus and pelvis or between the fetus and uterine cavity. Unless it can be definitely established that this disproportion is one of absolute or relative small size of the fetus, Caesarean section before the advent of labor should be the method of choice for delivery."

2. All primiparae over the age of 35 are best delivered by Caesarean section, because of the rigidity of the tissues. A recent writer²⁷ has tried to show by statistics that the only effect of age in primiparae is a slight increase in the duration of labor and a decided increase in the number of forceps deliveries. But while in some late primiparae delivery is not attended by great difficulty, in a not inconsiderable proportion of these cases an attempt at delivery by the natural passage will result in deep tears, profound shock and loss of baby. Therefore, in view of the safety of abdominal delivery for both

mother and baby, the method of choice in these cases should also be Caesarean section.

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CAESAREAN SECTION—OVERDONE.

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CAESAREAN SECTION is the most overdone operation in this community at present.

Caesarean section is overdone for many reasons. The principal one is that the idea—or delusion—prevails that it is an absolutely safe procedure. The principal reason it is considered safe is because it is simple. That does not follow. I shall try to show that Caesarean section is not especially safe.

De Lee, quoting Routh's series of 1280 Caesareans done in Great Britain to 1910, states that there has been a steady decrease in mortality until now in favorable cases the mortality is between 2 and 4%. In cases of prolonged labor when forceps had been attempted, the mortality was 34%. The general mortality was 11.6%; for the last five years 8.1%. Cases operated at the beginning of labor with membranes intact

showed a 2.2% mortality. De Lee says further: "In spite of most rigorous asepsis and a perfect technic, the operation has a high morbidity. Infected suture material has caused the most trouble in my cases, and the secondary union has been followed by four hernias that I know of. Ten of the forty-nine cases had severe febrile reaction, 1 marked peritonitis (re-operation, recovery), 3 post-operative pneumonia, 4 uterine abscess, and there were 2 cases of temporary ileus, 2 of dilatation of the stomach (all with alarming symptoms). Two women died, 1 from peritonitis, 1 from nephritis, the operation being undertaken for eclampsia. Taken all in all, it is not an operation to be lightly advised." "Polak in 1909 collected 150 cases of repeated section which showed a mortality of less than 5%."

Reported statistics with varying mortality can be added, series of 20, 30, or more cases without mortality have been reported; but the fact remains that about 5 women of every 200 subjected to elective Caesarean section at the most favorable time will die; and that about 20% of cases done for reasonable indication, but not under most favorable circumstances, will be sick. These figures may be shifted up and down at will by altering indications and circumstances. From the results with which I am familiar, without analyzing them at the present time because they will presumably be carefully analyzed and published in the future, I see no reason to consider that the results in Boston in excellent hands and favorable surroundings, operated at the time of election, are better in 1913 and 1914 than the above. In one public hospital, for example, the mortality from 1913 in January to 1915 in May was about 8% in 75 odd cases. By adding 13 cases without a death to August 31, 1915, we reduce the mortality to about 6.5%. By taking the last 42 cases alone, we can call the mortality 0. The purpose of these figures is only to show that there is still an appreciable death rate.

Outside of public hospital practice, I am familiar with 10 recent cases which illustrate the danger of the operation *per se* in private work, in private well-equipped hospitals in the hands of well-trained obstetricians. Presumably these cases were indicated; it is not the purpose to show that they were not. Seven of the 10 cases died; 3 recovered after being so sick that whether they lived or not seemed a matter of chance. What proportion these cases represent of the whole number of Caesareans done by this group of men is not the point. They occurred within a year in this community among a small group of good obstetricians.

It seems fair to admit at least, from above statistics, from these cases, and from anybody's experience with hospital cases, that Caesarean section is as quoted from De Lee above, "not an operation to be lightly advised."

On what indications is it being advised in this

community? The honest answer is, "Almost anything that keeps a baby from flopping into the world itself." We may omit discussion of the accepted reasons for doing Caesarean: for absolute pelvic indication, for relative pelvic and fetal head indication, for impacted pelvic tumor, for central placenta previa with tight long cervix, for atresia of vagina, for certain *ablatio placentae* cases with tight os. Nobody questions Caesarean for these indications; with them, if the patient dies, it is on nobody's conscience. The best has been done.

Let us look at some other indications that have been advised and see if on losing a patient by Caesarean for one of them the operator's conscience can be as clear.

(1) Primary Caesarean Section for Women with Unfit Nervous Systems and General Make-up. No men were better able to see this type of case and in better position to determine the theory of treatment than the authors of this theory at the time of its original promulgation. At present, however, with gas-oxygen anesthesia, it is possible to carry such a patient through a labor, or to a place in it where operation is safe, without strain. C. H. Davis of Chicago tells me he has used it eleven hours; it has been used hereabouts five or more, and can be longer. Scopolamin-morphine anesthesia in the hands of its trained advocates can be used for the same purpose in this type. It seems, therefore, that this indication is now limited strictly to the physically unfit, probably a very rare type.

(2) Caesarean Section for Primiparous Breech, where the presentation is not due to a manifestly small baby in relation to the pelvis. Any man fit to do Caesarean section presumably knows how to deliver or extract a primiparous breech as an expert; therefore the mortality on primiparous breeches in such hands may be called 10%, as stated by Williams and others. Some of the fetal mortality is due to failure of use, even by trained men, of two procedures, namely bagging the cervix to full dilatation if it does not dilate spontaneously, and deep episiotomy in a tight perineum. Much of the slight additional maternal risk due to the presentation is abolished by these procedures. Also many breeches are lost by a failure to flex the head before attempting to get it down, by not following the mechanism of the after-coming head in the flat pelvis, because an extra pair of trained hands is not scrubbed up, and because suprapubic pressure is not correctly applied. However, admitting the correct performance of these procedures and admitting for the sake of argument that 10% is the lowest mortality obtainable, which is probably not true, shall we submit a woman to a 2.2% immediate risk and a 5% subsequent risk in future Caesareans for the sake of a 10% fetal mortality? I think not. In addition, some primiparous breeches are cephalic monsters which often cannot be previously diag-

nosed on account of the tight wall. By Caesarean these less than desirable additions to a family have the best chance of living, a burden to all. Having subjected a woman to a Caesarean risk for a cephalic monster which lives, we must repeat the Caesarean with somewhat added risk in a future pregnancy with some chance of the same type of offspring. This is a very displeasing prospect. This raises the question of repeated Caesarean after the first, which does not need discussion here, except to say that the majority of the best men believe it wise, and that new evidence is accumulating in its favor all the time. A second Caesarean done recently in Chicago showed the uterine scar made up of half-inch spaces of peritoneum alone—intersected by small bands of muscle; in the opinion of the operator it must certainly have ruptured in labor. It is stated by the author of "Caesarean for Primiparous Breech" that no direct comparison between the fetal head and maternal pelvis can be made in breech presentation. This is true; but by carefully going over the head and pelvis, in the light of previous experience, a working judgment may be formed. Recently a patient with a pelvis 25-20-17-5½, rupturing membranes at the beginning of labor, delivered herself of a 6 lb. 14 oz. baby without perineal tear under gas. This illustrates what I mean: If the baby had been larger, Caesarean would have been considered in this pelvis.

(3) Caesarean Section on the Pelvic Indication. Reynolds and Newell's text-book states that 11-12 cm. is the normal diagonal conjugate. The true conjugate varies with the individual estimate and depends on the width and thickness of the symphysis and inclination of the pelvis; roughly it is from 3½-4 in., or 9½-10½ cm. Less than 3½ in. is a relative pelvic indication. It has been shown that many babies will be delivered safely or deliver themselves with minor degrees of pelvic contraction, and the decision for or against Caesarean rests on the size of the baby, and whether or not the presenting part can be put into the pelvis with or without an anesthetic, or whether or not it overrides the symphysis if it cannot be put in, and sometimes on what it will do under test of labor. We now come to a series of Caesareans done on minor degrees of pelvic contraction in cases with a disastrous previous delivery for the baby. As the cases are reported no attempt was made, either with or without an anesthetic, to determine the above points, nor were the cases allowed any test of labor. When we think of the general standard of obstetrics it seems unfair to subject a woman to Caesarean purely on her history. We have all seen cases, giving a history of and showing results of a previous hard operative delivery, deliver a second baby before the physician's arrival. The other day a woman with a flat pelvis, D.C. 10, who objected to an early anesthetic and in whom the fetal head could not be

put into the pelvis without, and seemed slightly to override, with a history of forceps delivery, the baby dying soon after birth, and the present baby estimated at 8 lbs., took in labor and when seen two hours afterwards, had the head well in the pelvis and nearly full dilatation: she came to easy low forceps. All things were previously prepared for Caesarean. This illustrates what I mean in this type of case.

(4) Caesarean has been done for other reasons, as follows:—

(a) After attempted high forceps in which the head could not be made to enter the superior strait. This may or may not be an indication. Successful difficult high forceps operations require a type of axis traction equipment which will make real axis traction. J. Whitridge Williams in his discussion of axis traction has pointed out once and for all that true axis traction can be made only with a rod and handle of the Tarnier type, that is a straight drop rod for the handle which falls below the anus, because the axis of the superior strait prolonged carries out through the tip of the sacrum. Irving has recently shown forceps of this type, superior to the Tarnier, but possessing this necessary feature. Most operators hereabouts use forceps with absolutely straight rods; they are powerful instruments but obviously do not make complete axis traction. Perhaps this accounts for some of the cases in which Caesarean is done when high forceps fails.

(b) Caesarean has been done for prolapsed cord in a young primipara, $\frac{3}{4}$ dilated, transverse, with true conjugate $3\frac{1}{4}$ in. and "fair sized baby." She had been examined by another physician. Why was Caesarean done? It is hard to see from the report.

(c) Caesarean has been done in a young primipara, true conjugate $3\frac{1}{4}$, fully dilated, transverse, arm prolapsed, membranes ruptured 5 hours, no mention of condition of uterus. No mention of baby. Why was Caesarean done? Certainly a fillet to the arm would have rendered version and extraction easier than otherwise, and bringing an arm up from the vagina with five hours ruptured membranes increased the risk of Caesarean.

(d) Caesarean has been done in the following case: Cervix not fully dilated after seven hours, with presenting arm, true conjugate $3\frac{1}{4}$, weight of baby not given, stated to be of large size; and for several other conditions; twins with first transverse and prolapsed arm; an intramural fibroid size of hen's egg, which made engagement questionable. No attempt to engage it is recorded.

All the above cases made absolute recoveries. Therein lies the danger. They will be repeated until maternal death occurs. The indication is not clear in any from the report.

(5) Caesarean in Toxemia of Pregnancy.

(a) Toxemia without convulsions. (b) Eclampsia.

(a) To take a toxemic patient without convulsions and subject her to a laparotomy, putting out of commission for some hours at least and sometimes days, our major practical eliminative channel—the bowel—and throwing added strain on the kidneys as well, seems irrational when we can bag the patient and eliminate at the same time labor is progressing, or in favorable and urgent cases, do vaginal Caesarean without putting the bowel out of action. It will be argued for this theory that it is more important immediately to get rid of the source of the toxin, i.e. the contents of the uterus, than to preserve the means of elimination of the accumulated toxin; but in practice it is to be remembered (1) that only a very small proportion of toxemias become eclamptics, if emptied by bagging on progressive symptoms; (2) that post partum eclampsia occurs sometimes as late as the seventh day, that it occurs especially if elimination is neglected; (3) that usually, though not invariably, the outcome of a toxemic case depends on whether or not it eliminates. Prognostically, if the bowels move the patient usually gets well. It may be that this is putting the cart before the horse, that toxemias who die do not eliminate because they are profoundly toxemic; but from either point of view elimination by the bowel is the most important single feature of a case.

(b) Eclampsia. The same argument holds good in eclamptics more strongly. Since they are more toxic it is still more important that they eliminate, hence Caesarean is unwise; since they are highly susceptible to shock, rapid instrumental and prolonged difficult manual dilatation is unwise; rapid vaginal Caesarean in suitable cases or bagging with traction is the method of delivery, controlling the fits with morphine and eliminating all the while. According to J. T. Williams, the maternal mortality is 48.2% in Caesarean for eclampsia, dilatation of the cervix 7% to 26%, and vaginal Caesarean 3% to 18%. I think consistently doing vaginal Caesarean on early and suitable cases, bagging with traction on cases with tight os not suitable for vaginal Caesarean and manual dilatation and delivery of those very readily dilatable will give better statistics than the above. An operator preparing to deliver a toxemic or eclamptic should have in his boiled out-fit suitable instruments for these three mentioned procedures.

Peterson, among others, in a large number of cases has shown that emptying the uterus as soon as possible is the wisest treatment of eclampsia and toxemia. This corresponds with the theory of disease. The reason Caesarean has appealed is because it is so rapid, it superseded naturally enough the rapid divulsing of the rigid cervix with its high primary mortality from shock and lacerations with sepsis and rupture, and is undoubtedly less risky in cases with

tight os. Vaginal Caesarean is unfamiliar and suitable only to cases in which the cervix can be pulled down and the baby is not too large; bagging with traction is considered too slow, requires sometimes an extra anesthesia from which the patient emerges undelivered, is not pleasant for the patient, requires time and constant attention, and infection is feared; hence it has not appealed. As a matter of fact it is more or less puttering and does take the physician's time, but such cases do anyway; it is not over pleasant for the patient, but it carries no greater risk of infection than any other cleanly done procedure; it is often surprisingly rapid, and it carries a margin of safety over division of the tight cervix and abdominal section. For reasons stated above it deserves far more consideration than has been given it. The greater safety compensates for its added time. One of the chief objections is that the stem of the bag frequently pulls off, but this will be remedied soon by making a bag reinforced at the junction of the stem and dilating portion.

Many Caesareans are done for toxemias and eclamptics. It is commonly stated by those who oppose Caesarean section for eclamptics that it should be done only when there is a pelvic indication in addition. I would go further than this and state that we should take longer chances on the pelvic indication than as though the patient did not have toxemia or eclampsia, and only do Caesarian in an absolute pelvis; first because the patient is more likely to die if we do Caesarean than if we do not, and a live baby and a dead mother is a poor combination, much poorer than a live mother with prospects and a dead baby; second because toxemic babies are notoriously likely to die,—in which case we may have lost both patients. To do Caesarean on an eclamptic or toxemic is to overrisk the mother for less than normal chance of a "going-to-live" baby. Therefore it seems logical to take more chances with the eclamptic or toxemic mother's pelvis than as though she were not toxemic, hoping, if it is a border-line, that the baby will be moulded down; if it isn't, high forceps, pubiotomy or craniotomy are fairer, the cervix being fully dilated by a bag. In a disease carrying the mortality of eclampsia, a live mother with prospects of more babies is enough to satisfy the most exacting. If a live baby is obtained so much the better; but consideration for a toxemic or eclamptic baby should not be allowed to increase the already great maternal risk.

(6) Caesarean for Breaking or Broken Cardiac. This is a procedure with high recommendation back of it, yet it does not seem logical. True, it removes all strains of labor, and so is perhaps applicable to cardiac cases still in good shape but near the danger line, or in cases which have broken and under appropriate treatment have come back; but in broken cases it adds the strain of distention, persisting often for some days if the patient does not succumb. A

broken compensation cardiac, especially a primipara, is a difficult case at best and statistics as yet do not show enough to state absolutely that Caesarean is contraindicated: the future will show; but these cases are even more prone to extreme distention than ordinary Caesareans, which in themselves, are very prone to have troublesome distention, and between the constant effort to relieve gas pressure and the gas pressure itself these cases may well die in the first few days of the puerperium of exhaustion. A certainly fairly definite percentage of Caesareans, too, get acute dilatation of the stomach; a broken cardiac developing acute gastric dilatation would be a bad risk. Also in Caesarean the intra-abdominal pressure is altered somewhat more rapidly than in delivery from below; this is theoretical but may deserve some consideration in the matter. The first stage of labor, especially under a narcotic, as morphine-scopolamine anesthesia with oxygen occasionally administered, takes little out of a cardiac, and the second may be handled with ether-oxygen narcosis from an ordinary Flagg portable gas-ether machine and forceps to prevent strain. It is a fact that many cardiacs dilate and even deliver with exceptional rapidity. Vaginal Caesarean with morphine-ether oxygen anesthesia seems the choice where induction is necessary and the case favorable; bagging when not.

(7) Caesarean Section Performed Any Time in Labor and under All Conditions. Within the last month two Caesareans were performed hereabouts in hospital under the following conditions: (1) Patient in labor 24 hours, membranes ruptured some hours, repeated vaginals and attempted forceps outside. Brought to hospital, uterus in tetanic contraction, membranes ruptured, enormous caput filling vagina, baby alive. Caesarean was done, a live baby obtained, mother ran a slight febrile convalescence and went home in good condition. (2) The other,—“twilight sleep” for 24 hours in a hospital; at the end of that time Caesarean was done for “insufficient progress.” On the fourth day temperature 103, pulse 130. Outcome not known.

The results of these operations do not alter the facts that the operators took too great risks, greater risks to somebody else than anybody has a right to take; and if they know enough to do Caesareans they know enough to know this. J. Whitridge Williams' recent article on Pubiotomy, written after a good many years' experience with it, and with a field narrowed by this experience, shows it to be the operation of choice on late, neglected or misjudged border-line cases, at least where a living baby is demanded; and craniotomy on a living child, especially when it stands a chance of intracranial hemorrhage or ultimate death from exhaustion, is indicated as against late and probably infected Caesarean.

(8) Caesarean Section by General Surgeons

Untrained in Obstetrics. Many surgeons hereabouts who profess themselves unable to apply low forceps, and those who are untrained in obstetrics but do not profess it, do Caesarean section, presumably under the orders of general practitioners whose professional judgment and care is not sufficient to tell them in advance in a reasonable number of cases what will be demanded at time of labor. One naturally questions on what and by whom is the decision made. And one is forced to the answers: "Because the baby does not come," and "By two men equally incompetent to decide." This may seem extreme; but when we have the surgeon operator, often professedly ignorant of obstetrics, and we hear from teachers throughout the country the deplorable condition of general obstetrical practice, it may not seem unfair. It may be and probably is true that it is safer for the average general surgeon to cut the baby out through the abdomen than to attempt to deliver from below, but why should a surgeon set up to do consulting obstetrics in one breath and be proud that he doesn't know how to use forceps in the next? Any good surgeon may be a good obstetrician as well, may indeed be a good obstetrical consultant, if trained and doing enough obstetrics to keep his hand in; that sort of man is not here referred to. The sort of man I do speak of is among us adding to the number of unnecessary and dangerous Caesareans.

(9) Caesarean section has perhaps in some instances been done for personal advertisement or for commercial reasons on account of the poor fee for poor work that is often paid for ordinary deliveries. These instances are rare, however, and since they occur in that small proportion of the profession who have sunk medicine in all its branches to the level of "make" require no comment here.

In conclusion, three matters present themselves in connection with this subject: (1) The old attitude of many general men toward Caesarean section persists—they still believe it is the saving operation of last resort. They have this idea so firmly fixed that in private hospitals they will hunt until they find some one who will do Caesarean in late cases; while in public hospitals cases they are frequently abusive when it is not done on their patients. (2) It is usually stated that the mortality on Caesarean babies is zero. It is not zero actually even if it is theoretically. I know of two macerated fetuses where the fetal heart was said to have been heard before operation; 2 babies died of "atelectasis" in some 75 Caesareans at the Boston Lying-in; occasionally a baby dies of prematurity, of congenital heart; monstrosities occur; toxemic babies die sometimes and so on. When figuring mortality in Caesarean babies from the practical point of view of the family you are forced to figure in mistakes in hearing, inexcusable if you like, but occurring, and in estimation of size and dates, and all other causes of death in the first two weeks of life except those

due to birth injuries. He who promises a normal live baby for every Caesarean, and this is being done as an argument for them, if he does enough will break his promise. (3) It is stated by men with good Caesarean experience that their patients are all well afterwards. This has not been my experience in the limited number I have seen after operation, nor is it possible to feel quite as optimistic in general in this regard as the men referred to, because we know that a certain number of laparotomies, especially women, are constantly aware of the operation either from scar pain, adhesions, bowel irregularity or "nervous knowledge." We know from secondary Caesareans that adhesions are the rule, though usually omental and benign; from examination that the uterus sometimes remains adherent to the lower margin of even the high incision—a manifestly distorted position. The high incision has decreased the probability of hernia quoted from DeLee above.

The purpose of this paper is not to cover Caesarean section. It is not to bring forward a statistical argument against it. It is, above all, not to belittle its honest value. It is written because a good thing exploited is apt to go bad.

"Interesting and valuable in connection with this subject is 'Obstetrics a Lost Art', Rudolph W. Holmer, Chicago, *Surg., Gyn. and Obstet.*, Nov., 1915. The present paper was in the publishers' hands about six weeks prior to the above publication."

ANAESTHESIA IN OBSTETRICS.*

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JUSTIFICATION for alleviating pain in labor lies in the degree of surety against harmful results, or in the preponderance of benefit to be derived over the risk of possible harm. There is no appeal to those who take pride and believe in the practice of obstetrics as an art, in the policy of "letting nature take its course." Newell, DeLee, and others have pointed out that labor in the woman of present-day civilization has ceased to be physiological. Pregnancy has not inaptly been called a disease of nine months' duration. We might add that the disease is always terminated by a surgical procedure, namely, labor. The dangers of shock, hemorrhage, and infection behoove the accoucheur to bring his patient through labor in as good condition as possible. It is incumbent on him, on the other hand, not to add to these dangers by ill-advised procedures.

It is the purpose of this paper to enumerate the various agents at our disposal for anesthesia in obstetrical cases, and from a recounting of their scientific actions to deduce theoretically their indications and contra-indications.

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But first let us inquire into the subject of labor pains and their mechanism, nervous and otherwise.

Painless labor is abnormal. Women, however, vary so greatly in degree of pain felt and ability to stand pain, that "clinical evidence" of success of any method of analgesia in a given case is unreliable.

There are several points to be noted about uterine pains. They are involuntary and yet may be influenced by higher nervous disturbances; for they may be inhibited or augmented by mental states or nervous shock. Perfect spreading of the contraction over the whole of the uterus apparently under certain conditions, may be easily interfered with, resulting in a contraction ring.

Normal pains are intermittent contractions, followed by relaxations. This mechanism may go wrong with formation of tetanic contraction.

Rhythmic contraction develops in a longer stage of increasing intensity to the apex, and then subsides gradually. The subjective pain does not commence until the contraction is well advanced. Therefore the beginning of a pain must be detected objectively, by the palpating hand on the abdomen.

As has been said, both actual suffering and ability to stand suffering vary in women. That the process of labor is painful goes without saying. Not only the process, but the resulting bruises and wounds must be painful in their production. The alleviation of pain in labor, if attended by a degree of proportionate safety, offers a strong appeal, if only to the humanitarian instinct. If, however, it can be shown that the relief of pain makes labor safer, it becomes the duty of the attending obstetrician to institute such procedure, following indications carefully and closely.

Little is known of the exact nervous mechanism of labor contractions. I quote from DeLee. A nerve centre "is believed to exist in the cortex, one in the medulla, in the cerebellum, and in the lumbar enlargement of the cord, because irritation at these points causes uterine contractions. There is an independent nerve centre in the uterus because the organ acts when removed from the body."

That the higher centers may affect uterine contractions is evidenced by either inhibitory or accelerator influences on labor by mental or emotional activity. That the brain is not necessary to the nervous mechanism is evidenced by the smooth (and painless) progress of labor possible in patients with transverse lesions of the cord. Afferent sensory impulses are transmitted from the cervix, as evidenced by pain. That a reflex centre in the cord is thus stimulated and an afferent impulse sent back is evidenced by the contraction of the cervix against forcible dilatation. That the reflex cord nervous mechanism is not absolutely essential to labor is presumed from the contraction of the isolated uterus and from the non-interference with

rhythmic uterine contractions under bromides, chloral, and light ether.

Sympathetic stimulation, as in the intestine, is depressor or inhibitory to contraction.

The uterine muscle during pregnancy develops an increasing tone or capability of contraction. That the stimulus for contraction comes from the distention of the organ by its contents, as in the case of the stomach, is reasonable to suppose. That this stimulus is acting throughout pregnancy explains the contractions that are known to occur, even in the early months. The precise reason for these contractions taking on force enough to expel the fetus, the actual cause of the onset of miscarriage, premature, or labor at term, is not clear. Whether it be an increase of carbon dioxide, an active hormone, or a lack of an anti-body in the blood; whether it be decidua changes, the passing of the fetus from a part of the maternal organism in effect, to the rôle of a foreign body; whether it be the reaction due to the increase of tonicity or irritability of the uterine muscle beyond a certain point; whether it is one of these or a combination is not known. Uterine contractions take place all through pregnancy, increase in frequency and intensity toward the end, are sometimes felt as false labor pains (generally by multiparae, the same individuals who suffer from after-pains), and finally become true labor contractions, regular in frequency, and productive of work in taking up or dilating the cervix.

In summing up the following points are important:

1. The primary stimulus for uterine contraction is in the uterus itself.
2. Depressor stimuli come from the sympathetic, inhibiting tone, as in the stomach.
3. Stimuli productive of uterine tone come from the cord and are important to proper contractions. (Analogous to vagal stimuli in the action of the stomach.)
4. Reflex motor stimuli come from the cord, retard the first stage of labor through spastic resistance to dilatation, but are important after labor to prevent hemorrhage.

If reflex spasm of the soft parts can be inhibited, theoretically labor will be shortened, for dilatation will more readily take place. Individual labors vary so in length of time that it is hard to prove this contention. The most that can be said is that clinically this theory seems to work out. It must be remembered that spastic contraction of the uterus after labor is of great advantage rather than a hindrance. Therefore the effects of cord-depressing drugs should have worn off by this time, that not only tone-producing but also reflex motor stimuli may be active.

We have then three problems in the conduction of labor under anesthetic agents: first, the alleviation of subjective pain; second, the inhibition of excessive reflex spasm; third, the removal of sympathetic depressor impulses.

Before taking up drug anesthetic agents, it may not be amiss to call attention to the rôle played by the nervous and mental condition of the patient in the process of labor. Hyperexcitability, exaggerated reflexes, augmentation of neurasthenic or hysteric taint are recognized as part of the pregnant state. The question might be raised as to how much fear, worry, etc., by excessive sympathetic stimulation, have to do with inertias and unsatisfactory labors, so frequent among finely and nervously wrought women. Suggestion, consciously or unconsciously, is used universally, and the benefits of the sympathy and encouragement of the physician are well recognized, but we wish to point out the distinct advantage to the patient in labor of a confidence in the obstetrician (engaged early in pregnancy); this confidence earned by the physician as a result of close supervision and solicitous interest in the handling of the antepartum period. It is reasonable to suppose that such hygiene of the nervous system obviates reduction of uterine tone from over-sympathetic stimulation.

Action on.	Pain.	Brain.	Cord Centre.	Resp. Centre.	Vasomotor Centre.	Heart.	Blood Pressure.	Sympathetic Nerve Endings.	Uterine Muscle
Bromides									
Chloral	SI	—	—	0	—	—	—	—	—
Scopolamine	—	—	—	—	—	—	—	—	—
Morphia	—	—	+	—	0	—	0	—	—
Heroin	—	—	+	—	0	—	0	—	—
Ether	—	—	—	—	—	—	—	—	—
Chloroform	—	—	—	—	—	—	—	—	—
Nitrous ox.	—	—	—	—	—	—	with asphyxia	+	+
Spinal anesthesia	—	—	—	—	—	—	—	—	—
Nerve Block	—	—	—	—	—	—	—	—	—

The Antipyretics. Quinine has a depressant action (after a short stimulation) on the central nervous system. Its action on muscle is the same. It has been advised as an ebolic rather than as an analgesic agent in obstetrics, and need not be discussed here except to say that to many obstetricians, favorable clinical results are wanting following its use.

The synthetic antipyretics are slightly depressant to nerve centers, but not efficient for pain, except of neuralgic type. Antipyrin in large doses has been said to have been used with success, but such use would seem to be contraindicated by dangers from poisoning.

Bromides. The bromides depress spinal reflexes, especially the connection between sensory and motor cell. They are of value to the obstetrician. When borne by the stomach or administered per rectum they aid greatly in relieving the vomiting of pregnancy, "pressure pains," and sleeplessness toward the end of pregnancy and in general in "taking the edge off the patient's nerves." They would seem to

be indicated at the beginning of labor; at the beginning because of their slow action, in one large dose. The indication in theory is to inhibit the spinal reflex, allowing labor more rapid progress. Their action is not strong in the presence of pain, but may be used as an adjuvant in combination with other drugs. Bromides, for temporary action, are safe, with no marked effect on other organs. Contraindications for their use are need of rapid action, fear of kidney irritation from the elimination of the salt, and sensitive stomach if administered per os.

Chloral. The action of chloral is depressant to brain and spinal cord. It does not depress the respiratory centre as morphia. There is a depression of blood pressure and of the vasomotor centre under its use. It has a depressive action on the heart and the blood vessel walls like chloroform. Sulphonal and veronal have less action on the heart, but are destructive to the hemoglobin.

The beneficial action of chloral in labor is universally known. It works by reducing pain and the cord reflexes. The result of its use, the "softening of the cervix" as described by some authorities, is the inhibition of the spinal reflex, productive of spasticity. The dangers from its use come from its depressant action on the vasomotor centre and the heart. The subsequent falling blood pressure might be advantageous in toxic cases, but is offset by its irritant effect on the kidneys.

Scopolamine (Hyoscyne). Scopolamine is in the atropine group, and resembles that drug in its peripheral action. It is said to act five times as strongly on the sympathetic nerve terminations. It does not stimulate the central nervous system as does atropine. It does not stimulate the vaso-motor or respiratory centers. It produces sleep by depression of the central nervous system, especially the brain. Reflex irritability is depressed by the drug. Scopolamine is indicated for obstetrical anesthesia because of its:

1. Depressant effect on the brain; as an adjuvant to the effect of morphia in controlling subjective pain.
2. Depressant effect on spinal reflex irritability, tending to decrease reflex spasm of cervix and soft parts, thus allowing more rapid labor.
3. Paralyzing effect on sympathetic nerve terminations in the uterus, thus removing depressant sympathetic influence. The contraindications will be taken up under the discussion of the combined use with morphia.

Morphia. Morphia is a depressant to the great psychical functions. It is specific for subjective pain. It has no effect on the circulation. In large doses it is a stimulant to the cord, except the respiratory centre. It depresses respiration. It has been claimed that morphia in small repeated doses has a depressant action on the smooth muscle of the intestine; this conclusion explains the constipating effect of the drug.

Most men are afraid to administer morphia after labor on account of "relaxing the uterus." If morphia has such an effect it must be due to direct action on the muscle, for the cord is not depressed.

The depressive muscle action being problematical, in uterine hemorrhage the relief of restlessness by morphia has always seemed of over-balancing benefit.

Incidentally, specific cord stimulation by a large dose of strychnia has always seemed clinically to the author to be the most effective treatment in producing tone in a poorly acting uterus postpartum.

Ether and Chloroform. These drugs produce a progressive paralysis of the nervous system, beginning with the brain and extending to the cord, and last affecting the medulla. They lessen uterine contraction. Chloroform is more pleasant and quick in action, and less amount is required. It is three times as depressant to the nervous system and forty times as depressant to the heart as ether. Chloroform is contra-indicated when fatty changes are present in the heart. They are both kidney irritants and contraindicated in renal disease. Both are said to lower the resistance to infection.

Ether being the safer, is the anesthetic of choice of most surgeons. The use of chloroform by well-experienced hands is not contraindicated when its advantages over ether are desired, and heart and kidney disease, etc., are ruled out. "Obstetrical ether" works beautifully at times, its efficiency generally being in proportion to the skill of the administrator and the tractability of the patient. The writer personally is in favor of substitution of forceps for the second stage of labor at the election of the patient and in the hands of the trained obstetrician. With any method of analgesia it must be remembered that the second stage will be prolonged to the extent with which voluntary efforts of the patient are inhibited. Also with general anesthesia, for delivery, the importance must be borne in mind of carrying patient as "light as possible" at the time of delivery, and thereafter to remove spinal depression and promote uterine tone.

Morphia and Scopolamine. The combination of these drugs would seem to be a happy one when the therapeutic effect is analyzed. They help each other in controlling subjective pain. It takes large doses of morphia to elicit the cord-stimulating effect of the drug, so that the cord-depressing influence of the scopolamine is probably predominant in obstetrical doses. The selective action of the latter drug on the sympathetic nerve endings produces an effect greatly to be desired, viz: the acceleration of labor by the removal of depressor sympathetic stimuli.

Contra-indications. It is certainly logical, therapeutically, that morphia-scopolamine anesthesia cannot be pushed to the extent of rendering birth pains, or even ordinary second-stage pains, free from discomfort without having

enough morphia in the baby's circulation to materially depress the respiratory centre. In fact, narcosis and asphyxia of the child have clinically been a constant bad result reported by those attempting painless delivery under this combination of drugs.

It has been pointed out that tone-producing and even reflex motor stimuli from the cord are important after delivery, to prevent hemorrhage. If scopolamine is pushed to the time of delivery it is logical to expect relaxation of the uterus postpartum through depression of the cord. And postpartum hemorrhage has been another of the bad clinical results reported from this use of scopolamine.

Prolonged second stage has also been reported as a common result of carrying morphia and scopolamine anesthesia to delivery. This would seem a reasonable effect from interference with voluntary efforts on the part of the patient. It is evident that morphia narcosis of the fetus is not dangerous as long as the maternal blood supply furnishes the respiratory function. Also that depression of the cord to a certain degree is desirable in the first stage.

Idiosyncrasy to these drugs with delirium, etc., is, of course, a contraindication to their use. It is our conclusion that the conduction of the second stage of labor and delivery under morphia and scopolamine anesthesia is contraindicated. Furthermore, the administration of these drugs should be stopped three to five hours before expected delivery, according to the amount that has been given.

Nitrous Oxide. The action of nitrous oxide is depressant to the central nervous system, just as chloroform and ether. Rising blood pressure may occur, due to asphyxial condition of the blood.

Nitrous oxide is the safest anesthetic known. Contraindications to its use exist only when administered to any asphyxial degree.

"Carbonization" of the maternal blood is injurious to the fetus. With cyanosis a rise in blood pressure may result, which contraindicates its use as a general anesthetic in toxemic cases. "Obstetrical gas" is so safe and so easy of administration that it should appeal strongly to the general practitioner. This subject is ably covered in a communication from Dr. Paine, which will be published in *Surgery, Gynecology and Obstetrics*. I refer the reader to this article for description of technic.

Dr. Paine calls attention to the clinical increase in force of uterine contractions under gas analgesia, and suggests this effect is due to oxytotic properties.

I am rather opposed to the use of an oxygen-and-ether-added-apparatus, for it gives a temptation to the administration of too deep states of nitrous oxide. These deeper states would more safely be secured with straight ether. I am opposed to gas-ether sequence, not only on account of the possible injury to the baby from cyanosis.

but also on account of shock to the mother from rapid ether absorption.

Cocaine. The cocaineization of the cervix through a long labor presents dangers of absorption too great to recommend its use. Routine blocking of the pudic nerves or spinal cord presents difficulties in technic and dangers from infection too great to render the practice advisable. However, we wish to go on record as favoring spinal anesthesia as the anesthetic of choice in obstetrical operations, either from above or below, in threatened or eclamptic cases, for three reasons:—

1. Avoidance of kidney irritation.
2. Fall in blood pressure.
3. The blocking of impulses from the field of operation, which might be the exciting cause of convulsions.

In conclusion it would seem apparent that no method of anesthesia is safe through the whole of labor. The varying indications and contra-indications must be followed carefully and closely, with the safety of both mother and child in mind. For long, primiparous labors the following sequence would seem to be best: The proper use of bromides, chloral, or morphia-scopolamine in the first stage; the administration of these drugs to be stopped in time so that their effects shall have worn off by the time of expected delivery; nitrous oxide administration during pains according to technic described in Dr. Paine's communication, with or without the change to obstetrical ether for delivery; or, in the hands of the trained obstetrician, the substitution of forceps for the second stage, under sufficient ether anesthesia.

NITROUS OXIDE IN OBSTETRICS.

By FREDERICK C. IRVING, M.D., BOSTON.

THE distinction of having first used a combination of nitrous oxide and oxygen to abolish the pains of childbirth belongs to Klinkowitch of Petrograd, who published his results in 1880. Beginning when the os was two fingers dilated, he administered 80 parts of nitrous oxide and 20 parts of oxygen to 25 patients. He gave only enough to alleviate or abolish the pain without producing anesthesia. His results were so gratifying that it is difficult to see why his work has never been repeated until recent years, especially since it is well known that dental surgeons have long used a similar combination of the two gases with complete success. To demonstrate that under this method labor pains were not weaker, shorter or less frequent than normal, Klinkowitch inserted an elastic bag into the cervix, filled it with water, connected it with a manometer and kymograph by means of a pipe line, and made graphic records of the uterine contractions.

He concluded that the efficiency of labor was not diminished, but, if anything, increased. His impressions regarding success in the relief of suffering, immediate safety for both mother and infant, and the absence of untoward after-effects are in exact accord with those of recent investigators.

Tietel in 1883 and Doederlein in 1886 gave gas and oxygen to the surgical degree in operative obstetrics. For the past ten years J. C. Webster of Chicago has been using it in a like manner, and occasionally, given to complete narcosis, during the expulsive stage only of normal delivery. In 1911, Guedel of Indianapolis reported in detail five cases in which he had given nitrous oxide and air as an analgesic during labor, and described a small portable machine for its use. Lynch in 1913, Webster in 1914, and Lynch, Webster, Heaney, Buchanan, Skeel, Davis and Luther during the past year, have all made contributions to the literature.

Pharmacology of Nitrous Oxide Alone, and Combined with Oxygen. Nitrous oxide alone is a specific anesthetic and exercises an individual action upon the brain cells. Its anesthetic property formerly was thought due to asphyxia. That this is not true is shown by the addition of oxygen, which eliminates asphyxia, and yet does not impair its virtue as an anesthetic. It exercises no destructive effect upon the plasma or corpuscles, and is carried merely as a physical solution. Blood pressure is always raised by nitrous oxide alone. With a judicious admixture of oxygen, however, this change is slight. No effect is exerted upon the liver or kidneys, and it is eliminated solely by the lungs. There is no irritation of the air passages. Nausea and vomiting are not due to any inherent property of the gas, but, when present, always suggest faulty administration. The lessened amount of tissue change under nitrous oxide anesthesia connotes a smaller amount of carbon dioxide given off by the body. By the employment of rebreathing, a further conservation of CO_2 is effected, thus aiding in the prevention of shock, according to the theory of Yandell Henderson.

When nitrous oxide alone is given, the patient passes from consciousness to full anesthesia in from 30 to 60 seconds. Any attempt to divide this brief period into stages of anesthesia is manifestly impossible. Mixed with oxygen, however, a more leisurely method of induction is permitted and four stages are distinguished:

1. The stage of analgesia. The patient first experiences a sensation of warmth in the lips, followed by numbness in the extremities and a feeling of exhilaration. In the first part of this period sensation is more acute; in the latter part the patient is analgesic, and it is in this condition that the operator aims to keep his obstetric patient when he is giving the gas for the relief of pain. If the concentration of nitrous oxide is now raised the patient passes into the

2. or stage of excitement. This period begins with the loss of consciousness. Incoherent thoughts and words and purposeless muscular movements are apt to occur. No surgical procedure should be attempted during this stage, for although the patient will neither suffer pain nor retain the memory of it, any rough manipulation will serve only to intensify the excitement.

3. The stage of surgical anesthesia is attained in from one to four minutes. Breathing should be automatic and regular. The lid and other reflexes are abolished and relaxation is more or less complete.

4. The stage of overdose manifests itself by increasing lividity accompanied by excessive breathing. Dyspnea succeeds, followed by convulsive expiratory efforts, which gradually become weaker until death supervenes.

Rapidity of Elimination. Kemp ascertained that the concentration of nitrous oxide in the blood fell in less than two minutes from over 20% to 6.9%.

Safety. Gwathmey states that in suitable cases, combined with oxygen, it is the safest anesthetic there is. The mortality is generally placed at 1 in 50,000.

Contraindications. It should not be given to the very old, the very young, or the debilitated. Patients with arteriosclerosis, valvular disease of the heart or a high blood pressure should take some other anesthetic.

Full surgical anesthesia can be maintained indefinitely with nitrous oxide and oxygen, but not with nitrous oxide and air. It requires 8% oxygen to prevent spasm and cyanosis. Only 1-5 of atmospheric air is composed of oxygen; the remainder is nitrogen. Therefore it requires 5 x 8, or 40%, air to supply the necessary 8% oxygen. This 40% of air would so dilute the nitrous oxide that continued anesthesia would be impossible. It is evident, however, that analgesia, which occurs during the latter part of the first stage of administration and requires a smaller concentration of nitrous oxide, may readily be maintained for so short a time as the duration of a labor pain by the simple admixture of enough air to prevent cyanosis.

The method used by the writer does not differ essentially from any hitherto published. For the first few cases a nasal inhaler, as recommended by Lynch, Webster, Heaney and Buchanan, was used, but it was found difficult to prevent mouth breathing during the birth of the presenting part, when full anesthesia is desirable. Since then a surgical mask has been used with perfect satisfaction. Whenever labor is well advanced and the patient considers her sufferings too great to be borne, the administration is started. The machine, a very simple one, previously has been explained to her and she has been allowed to breathe air through it to assure her that she will not be suffocated. The rubber collar about the rim of the mask has been

inflated with the smallest possible amount of air necessary to make it fit the patient's face. The writer has seen gas administration a failure because this collar has been so tightly blown up that it left a space below the malar eminences and admitted so much air that neither analgesia nor anesthesia was possible. The bag is filled with nitrous oxide and the patient holds the inhaler in her hands. Just as soon as a pain begins she places it over her face and closes the air valve, which at the same time admits gas to the mask. She takes five or six deep breaths which she re-breathes into the bag and continues breathing nitrous oxide until she feels herself going to sleep when she releases the air valve, thus shutting off the gas. Should any painful sensation return, she again closes it and proceeds as at first. This places the regulation of analgesia in her hands. After eight or ten breaths have been taken the operator admits a small amount of oxygen to prolong the analgesia, and prevent cyanosis. The exact percentage of oxygen is of no importance, and the anesthetist determines by questioning the patient the amount necessary to achieve the desired result. If the pains become too severe to be controlled by this method, the expiratory valve is opened and the patient receives fresh nitrous oxide with every breath. The relief is so grateful that after a severe pain which has required a strong concentration of gas for its control, she is apt to lapse into unconsciousness. This is rather a pleasant experience than otherwise, and is infinitely better than allowing her to suffer because the anesthetist is afraid she will go to sleep. It is impossible for her to become very deeply anesthetized at this stage because the inhaler will fall from her hands before such a condition of affairs can happen.

Essentials of a Gas Machine Suitable for Obstetric Work. (1) It must be so small and light that it may be transported and used anywhere. Most "portable" machines on the market are only slightly less stationary than those designed for hospital use. (2) It must be so simple that it will not readily get out of order. (3) There should be a device for the addition of ether, should the obstetrician wish to use this anesthetic for an operative delivery.

Results. Lynch has used nitrous oxide and oxygen for over 1 hour in 34 cases, over 2 hours in 32 cases, over 3 hours in 12 cases, over 4 hours in 4 cases and in 1 case over 6 hours.

The writer has employed this method of analgesia in 34 cases; 24 were primiparae and 10 multiparae. 7 received it for less than 1 hour, 9 for more than 1 hour, 13 for more than 2 hours, 4 for more than 3 hours and 1 for more than 5 hours. 32 patients had complete relief from pain from the moment the gas was started. They all stated that they could feel the uterine contractions, but that they were painless. Two patients had imperfect analgesia toward the end of labor. Probably the gas was not started at the

very beginning of the uterine contractions or it was not given in sufficient concentration. There was no undue post-partum bleeding or untoward effect of any kind upon either mothers or infants. Three babies were born dead; two of them were macerated fetuses and one was a monster still-born at seven months. All others cried promptly at birth and none required resuscitation. From the standpoint of both patients and obstetrician, the results were most satisfactory.

Cost. Webster and Lynch place the cost at from four to five dollars per hour, Davis at \$1.50 an hour. Skeel's estimate of from 30 to 50 gallons of nitrous oxide and 15 to 20 gallons of oxygen per hour, is more moderate and more nearly approaches the experience of the writer, who, by the extensive employment of rebreathing, finds that the cost does not exceed seventy-five cents an hour. By the use of large hospital tanks, the expense can be still further reduced.

Other Uses in Obstetrics. One of the most satisfactory points about nitrous oxide and oxygen is the increased freedom with which the obstetrician may make bimanual examinations before or at the beginning of labor, when an attempt is made by the method of Müller and Kerr to fit the presenting part into the pelvis in borderline cases. After some experience with ether used for this purpose, the writer was much surprised at the relaxation obtained under full anesthesia in seven cases where the question of Caesarean section arose. The patient was so little disturbed by this most valuable diagnostic procedure that there can be no possible reason for not employing gas and oxygen in all cases where there is a question of disproportion.

Other obstetric manipulations where this form of anesthesia is valuable are: the introduction of Voorhees bags and of uterine packs; flexion of an extended head or conversion of a posterior to an anterior position; replacement of a retroverted and incarcerated pregnant uterus; removal of an incomplete abortion or the giving of an intrauterine douche.

CONCLUSIONS.

1. Nitrous oxide and oxygen is the most successful analgesic known for the relief of the pains of labor.
2. It is the safest anesthesia there is. It has no untoward effects, immediate or remote, upon either mother or baby.
3. It does not delay labor or in any way impair the efficacy of the uterine contractions.
4. It is pleasant to take, and recovery from it is extremely rapid and usually featureless.
5. It can be administered anywhere and it can be employed by any physician who will take his confinement cases seriously enough to retain a capable assistant for its administration.

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A SECOND STATEMENT REGARDING THE RESPIRATORY MECHANISM IN PNEUMONIA.

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I.

A FORMER communication* presented evidence that in cats with pneumonia the reaction of the respiratory mechanism to carbon dioxide is greatly impaired.

This reaction is also impaired in dogs with pneumonia.

Following are typical examples: Dog No. 9, Nov. 28, was tested 25, 29, 31 and 33 hours after the injection of Friedländer's bacillus into the lung. The last test was 40 minutes before respiratory death. When the carbon dioxide in the inspired air rose to 5%, the increase in the cubic centimetres of air breathed per minute was, respectively, 205, 152, 74 and 37% of the volume breathed per minute in atmospheric air. Normal dogs increase, as an average, 300%.

Three dogs, very ill with pneumonia, breathed atmospheric air at the rate of 5000 c.c. per minute; at 5% of carbon dioxide, they increased the air inspired per minute by 89%. Three normal dogs also breathed 5000 c.c. per minute; at 5% carbon dioxide, the normal dogs increased the air inspired per minute by 220%.

It will be observed that in atmospheric air these pneumonia dogs and these normal dogs breathed the same number of cubic centimetres per minute. Hence the failure of the respiratory mechanism to react cannot be explained by the statement that the pneumonia dogs, part of whose lung could not aerate the blood, were for compensation breathing already so much that they could not increase to meet the increase of

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the carbon dioxide in the inspired air. Additional evidence is as follows: (1) As the disease advances, the carbon dioxide reaction diminishes; so may the initial ventilation (i.e. the volume of air breathed at the beginning of each test). (2) If the failure to react were due to the loss of respiratory space from hepatization of the lung, large consolidations should be accompanied by a large reduction in the carbon dioxide reaction, and small consolidations by small reductions. This is not the case; there is no parallel between the area of consolidation and the amount of the reaction. (3) By injecting starch into the lungs, we have solidified areas as large as those hepatized in bacterial pneumonia, but in these starch pneumonias the carbon dioxide reaction was normal. (4) The impairment of the respiratory mechanism increases progressively, while the area of consolidation may remain unchanged.

II.

The impairment of the respiratory mechanism cannot be due to injury of the respiratory nerve cells by bacterial poisons in the blood. Friedländer's bacillus injected into a vein produces a bacteremia identical with that occurring in pneumonia, but the respiratory mechanism reacts normally.

The impairment cannot be due to products of the pathological process in the lung acting on the respiratory mechanism through the blood. The reaction remained normal when the blood of dogs dying of pneumonia was injected into a healthy dog.

Nor can lack of oxygen explain the failure to react. The portion of the lung not consolidated is usually ample for oxygen needs. Moreover, we have thus far been unable to improve the breathing in pneumonia by the use of oxygen, even under pressure; nor has artificial respiration materially altered the course of the disease.

III.

The following experiments show that the failure of the respiratory mechanism in pneumonia may be prevented by section of the vagus nerves.

Dog No. 51. Friedländer's bacillus was injected into the lungs at 5.30 p.m. March 13. Nineteen hours later both vagi were cut. Twenty-two hours after injection the dog was in complete coma; the rectal temperature was 31°. When the carbon dioxide in the inspired air rose to 3 per cent., the air

inspired per minute was doubled—a wholly normal reaction. Two hours later, the dog died. The middle and lower lobes on the left side and half the middle lobe on the right side showed typical red hepatization.

Dog No. 44. Friedländer's bacillus was injected into the lung at 1 p.m. March 10. At 1 p.m. March 11, the respiration was 154, and the temperature 40°. The dog was tracheotomized and both vagi cut. Two hours later, the temperature had fallen to 38°, and the respiration was 32. At 7 p.m., respiration 16, temperature 35° C. Artificial respiration was now given for ten minutes. At 7.10 p.m. the artificial respiration was stopped and, after a suitable interval, the carbon dioxide reaction was measured. At 3 per cent., the volume of air inspired per minute was doubled—a wholly normal reaction. At 7.55 p.m., the dog died. Autopsy showed the usual hepatization.

In both these experiments, in which the vagus nerves had been cut, the respiratory mechanism gave a normal reaction shortly before death. In our numerous observations, the reaction in animals equally ill, but with intact vagi, has always been much impaired.

Attention is called to the fact that in Dog 44, section of the vagus nerves was followed by a fall in temperature from 40° to normal. We have observed a similar fall in other dogs. In this respect, the experiments of Feb. 10 are significant. On this day, Friedländer's bacillus was injected into the lung in nine dogs. One received 1 c.c.; two received 2 c.c.; two others, 3 c.c.; two, 4 c.c.; and two, 5 c.c. per kilo. Eight of the dogs died in from 30 to 44 hours, the average being 36 hours. One dog recovered. He had received 4 c.c. per kilo, but had been vagotomized 22 hours after infection. At this hour, his temperature was 40° and he seemed very ill. After section of the vagus nerves, he was given artificial respiration. He shortly became quiet and the temperature fell gradually to normal. Forty-eight hours after inoculation he drank water (in our experience a valuable prognostic sign), seemed tired, but otherwise not ill. A few hours later he seemed to have recovered entirely and was, accordingly, killed. Autopsy showed complete hepatization of the right lower lobe.

The cutting of the vagus nerves seemed in this case to affect favorably the course of the disease. A similar impression was gained from the experiment of March 17. Four dogs received 1 c.c. per kilo at 9.30 a.m. The vagus nerves were cut at 4 p.m. Three of the dogs died in less than 24 hours. The fourth dog lived about 60 hours, and perhaps would have lived longer but for an accident. He was found dead with the tracheal

cannula tightly stopped with mucus. In this dog, section of the vagus nerves was followed by a gradual fall in temperature from 41° to normal. The temperature remained normal more than ten hours and then gradually rose to 40° C. The autopsy showed the right lower and right middle lobes grey, not friable, somewhat soft, and on section extruding a greyish sero-purulent thick liquid. A culture from the heart's blood gave a profuse growth in bouillon.

The three dogs in this group who died exhibited the stormy, spasmodic type of vagal breathing, which is frequently fatal even without pneumonia.

The observations here recorded afford positive evidence that vagal section may prevent the depression of the respiratory mechanism in pneumonia and justify the hope that vagal section may favorably affect the course of the disease.

CONCLUSIONS

1. The reaction of the respiratory mechanism to carbon dioxide is greatly diminished in pneumonia.
2. The graver the disease the less is the reaction.
3. The section of the vagus nerves may prevent this depression of the respiratory mechanism.

Medical Progress.

RECENT PROGRESS IN PSYCHIATRY.

BY HENRY R. STEDMAN, M.D., BROOKLINE, MASS.

(Continued from page 432.)

VIOLENT TEMPER AND ITS INHERITANCE.

Davenport¹ has made a study of 165 family histories of wayward girls in State institutions. This is accompanied by a number of tables and pedigrees, and the following conclusions are arrived at:

1. The tendency of outbursts of temper—"tantrums" in adults—whether more or less periodic or irregular, and whether associated with epilepsy, hysteria, or mania, or not, is inherited as a positive (dominant) trait, typically does not skip a generation, and tends, ordinarily, to reappear, on the average, in half of the children of an affected parent.
2. It would seem to follow from the data here presented that epilepsy, hysteria, and mania are not the causes of the violent tempers frequently accompanying them; the violent outbursts are in no sense the "equivalent" of these various psychoses. Rather the violent outbursts of temper are due, in all these associations, to a factor that causes periodic disturbance (possibly paralysis of the inhibitory mechanism?).

This factor has the greatest effect when acting on a nervous system that is especially liable to show the other psychoses. In other words, "tantrums" are apt to be associated with these various neurotic conditions while they have no necessary connection with them.

PSYCHOSES IN THE RUSSIAN ARMY; ABSENCE OF ALCOHOLIC INSANITY.

Gerver² divides the war psychoses into three classes: To the first belong psychoses arising in persons without any heredity taint, being caused solely by the war environment and violent emotions resulting from battles. To the second class belong psychoses that would develop in ordinary circumstances of peace, but which were prematurely brought on by the war. Here belong dementia precox, manic-depressive insanity, paranoia, paralytic dementia, etc. To the third class belong traumatic psychoses, caused by wounds and contusions. The psychoses of the first category do not differ in any way from the old types, but they may be subdivided into those caused by battles, by trench life, and the rear guard psychoses. Clinically, they belong to the acute mental disorders, amnesia and asthenic psychoses. Frequently they develop in the form of neurasthenic insanities. The specific character of war psychoses of all the three classes consists in the peculiar coloring and the character of the hallucinations, illusions, delusions, and the patient's conduct. The contents of the hallucinations and delusions are the experiences of war life. Another feature is depression, followed often by excitement, and confusion of consciousness. The character of the battle (artillery, infantry, bayonet attacks, etc.), the duration of the war life at the front, the course of military events (offensive or defensive, victories or defeats), and the general morale of the army determine the larger or smaller proportion of psychoses that develop. Gerver further claims that in the present campaign, the amount of psychoses is comparatively small, about one per thousand; in the previous wars the rate was two or three per thousand. The main cause of the decreased rate is the total absence of alcoholism. In the Russo-Japanese War, this was responsible for one-third of all the psychoses. In the present campaign there has not occurred a single case of alcoholic insanity.

PRESENILE DEMENTIA.

Benders³ has been able to find only two cases in the literature, similar to four he has encountered in the course of a few years. Another case from the records of the Meerenberg asylum in his charge, might be included in the group. This case was in a man, but his own four patients were women in the fifties. In all, there was a rapidly progressive loss of memory, and loss of the faculty of perception. The brain seemed to have lost the faculty of responding to

impressions, especially optic impressions. They paid no attention to anybody or anything, and stayed indefinitely wherever they were placed, never speaking, not even to themselves, when constrained to speak, merely repeating some single word or their own name. There never was anything to suggest the Korsakoff or analogous syndromes; the symptoms were only those of the dropping out of certain mental faculties—deficit phenomena. Necropsy in one case, and in the two on record, showed pronounced atrophy of the frontal convolutions. The remainder of the brain was microscopically normal, but the microscope showed in parts of the cortex that the cells had evidently suffered much. A significant feature of all the cases was that the mother in two cases, and the father or a brother in the others, had had apparently the same trouble in their day. Heredity as a factor in senile dementia has not been sufficiently emphasized hitherto, he remarks, citing Tay-Sachs' findings in amaurotic idiocy in analogy.

THE DUCTLESS GLANDS WITH SPECIAL REFERENCE TO HYPOTHYROIDISM.

Kojima¹ has examined the ductless glands from 110 consecutive autopsies at Claybury Asylum. The average weight of the thyroid gland in the insane is generally smaller than the normal. Thus the average weight is 16.46 gm. in the male, and 16.87 gm. in the female; in 12% of the male, and 18% of the female, the thyroid glands were under 10 gm. Considerable variations in the weight are found among the female cases about the climacteric, and in many female cases of affective psychosis, the thyroid was very large. The weights of the external parathyroids vary from 0.01 gm. to 0.7 gm. In 21.0% of the cases four glands were found. The average weight of the pituitary body is 0.56 gm. in the male, and 0.62 in the female. In the female cases in which the thyroid glands were small, the pituitary was generally large. The weight had no relation to the nutrition of the body, nor to the form or duration of the insanity. The average weight of the pineal gland of the adult is 0.127 gm. in the male, and 0.198 in the female. There is no difference corresponding to any particular disease. The adrenals of the male are, generally speaking, heavier than in the female. No definite conclusions can be arrived at regarding the weight of the reproductive glands in mental disease, but in certain female cases, where the thyroid gland was small, the ovaries were also small.

The systematic microscopic examination of all the ductless glands in four cases of the above series, excludes the probability that changes in any other ductless glands than the thyroid, can be held accountable for the mental symptoms, and the histological changes found in the central nervous system.

(To be continued.)

Reports of Societies.

BOSTON SURGICAL SOCIETY, (Incorporated.)

MEETING No. 8.

A CLINICAL meeting of the Society was held on Monday, December 6, 1915, at the Boston City Hospital.

The following operations were performed:

1. Inguinal hernia. Ferguson's operation. Dr. J. B. Blake.

2. Duodenal ulcer. Posterior gastro-enterostomy. Dr. F. B. Lund.

3. Chronic osteomyelitis of tibia. Dr. F. J. Cotton. Boy of 5 years. July, 1915. Three weeks after injury (and one week after the onset of symptoms) was operated for cellulitis of leg. In August medullary cavity opened, and a moderate amount of pus obtained. Sinuses closed but abscess cavity and sequestra present by x-ray. Incision, removal of sequestra and of about three-quarters of shaft, chiefly overgrowth interspersed with foci of infection. Cavity cleared; smoothed; disinfected with carbolic and packed.

4. Excision of fibrous tissue between ends of the fragments of ununited fracture of the humerus. Dr. E. H. Nichols. Case history: A. W., deck-hand, 50 years old. September 18, 1915, fell down stairs on his right arm, was taken to the East Boston Relief Station and put in an internal angular splint, with coaptation for six weeks, and at the end of that time there was no union. Admitted to the Boston City Hospital, Dec. 3, 1915, with a fracture of the right humerus at the junction of the middle and upper thirds, with mobility and crepitus. The joint is not a complete flail joint, but there is no evidence of union. It is said that at the time of his primary injury an attempt at reduction was unsuccessful, but the second attempt gave end-to-end approximation. An x-ray taken after his admission to the Boston City Hospital showed a "transverse fracture of upper and middle thirds of humerus, with good end-to-end approximation."

At the operation, Dec. 6, 1915, there was an incision three and a half inches long made on the outer side of arm over site of fracture. The incision was carried down to the bone, periosteum was opened and a small amount of callus found, but none at the level of the fracture. A firm, white, fibrous scar, obviously arising from fibrous tissue, was seen extending from the ends of the bone, and between two periosteal calluses. A considerable amount of granulation tissue was removed from the ends of the bone. The fracture was not a strictly linear one, but was jagged, and several spurs of bone were removed from either end; this allowed perfectly good approximation. The periosteal contour was approximated as carefully as could be, the muscle approximation with catgut sutures, and the skin closed with S.W.G. sutures. Double sling.

5. Reduction by plantar flexion of a "Cotton" fracture, i.e. fracture of the fibula and of the posterior articular surface of the tibia at the ankle joint. Dr. F. J. Cotton. Method of reduction shown: Plantar flexion of the foot; traction on foot downward and forward; counter traction by assistant. This reduces the displacement; then sharp dorsal flexion locks the ankle, so that there

is no possibility of re-displacement backward. Plaster put on, and the manoeuvre repeated with pressure upward on the ball of the foot until plaster had set. (This patient was given gas-oxygen anesthesia with the Clark apparatus, by Dr. F. L. Richardson.)

6. Double inguinal hernia of enormous size, operated upon simultaneously by Dr. F. B. Lund and Dr. John Cunningham, Jr. (by invitation). Case history:

Man, 50 years old, mate on a steam fishing trawler. Fifteen years ago right inguinal hernia observed, followed by a left inguinal hernia one year later of unknown origin. Trusses of various varieties have been of no service. The hernia continued to grow constantly, and at the time of operation was the size of a common football.—the right side being slightly larger than the left. The general health of the patient is excellent, and the bowels move regularly without cathartics.

Operation: Dr. F. B. Lund, left side; Dr. John H. Cunningham, Jr., right side. The left sac contained the sigmoid and several loops of small intestines. The right sac contained the cecum and several loops of small intestines. The appendix was removed, stump invaginated; appendix being normal. Contents of the sac were reduced into the abdomen, sacs transfixed, tied, and removed. The stumps fixed above the internal ring by mattress sutures. The conjoined tendons and Poupart's ligament were united, and the fascia of the external oblique placed beneath the cords on either side. The cords were left in the subcutaneous fat and the external wound closed by interrupted silk worm gut sutures. The Cunningham hernia dressing applied. Duration of the operation, 45 minutes. Anesthesia: ether, with Clark's apparatus.

DEMONSTRATIONS.

1. A case of giant-cell sarcoma of the neck of the femur. Dr. J. C. Hubbard. History is as follows:

Male. Spontaneous fracture two years ago. Incision and curetting. Plaster spica. At present walks with but a slight limp; only a slight limitation of motion. No subjective symptoms. X-ray shows a questionable area still present in the bone. Pathological report of tissue removed at the operation—osteosarcoma.

2. X-rays of a case of Hirschsprung's disease. Ileosigmoidostomy. Dr. J. C. Hubbard. History of the case: Woman twenty-three years old, who since childhood had had trouble with her bowels. Attacks of fever, delirium, and obstruction; development of a tumor in the left side. When first seen, enemata of no use. Ileosigmoidostomy and later resection of the colon. At present patient is well.

3. X-rays in a case of intestinal stasis. Dr. J. C. Hubbard. Ileosigmoidostomy with immediate resection of the colon. Great improvement. Considers herself now perfectly well.

4. A case of rupture of the spleen. Dr. J. B. Blake. A boy, eighteen months after rupture of the spleen, in whom the history and physical findings delayed the operation twenty hours. He has a very long scar. The upper part of the wound drained. There is not the slightest tendency to hernia, although he indulges in extremely active exercise.

5. X-rays of three interesting fractures: (1) Multiple thigh fracture. Double fracture of the

femur in a delirious patient, which united firmly in spite of constant motion on the part of the patient, who persisted in tearing off the apparatus. (2) Multiple fracture of patella. X-ray before and after four operations for four consecutive fractures of the patella. (3) Central dislocation of the head of the femur. X-ray of fracture of pelvis with central dislocation of head of femur in a patient who suffered also from the same accident a compound fracture of the shaft of the humerus and a fractured skull.

6. Demonstration of the "frog plaster" double spica in fracture of the hip. Dr. F. J. Cotton. This case was an extra-capsular fracture in a middle-aged woman. Actual advantages of method: ease in caring for patient on account of ability to sit up; better chance for the old against lung complication; against apathy from monotony. It seems an excellent way to maintain position after correction.

7. Sarcoma of the chest wall with metastasis. Dr. F. B. Lund.

ROBERT B. GREENOUGH,
Secretary.

CLINICAL CONFERENCE OF THE NEUROLOGICAL INSTITUTE, NEW YORK.

REGULAR MEETING, OCTOBER 7, 1915. DR. J. RAMSAY HUNT IN THE CHAIR.

OBLITERATIVE ENDARTERITIS OR RAYNAUD'S DISEASE.

DR. C. BURNS CRAIG, from the first division, presented a case of sciatic pain with gangrene of the toes. The case is presented for a differential diagnosis between obliterative arteritis and Raynaud's Disease. The patient, a male, 51 years of age, is a bartender, a native of Germany. Had typhoid fever 25 years ago. Immediately following his recovery from typhoid he had difficulty in the use of the right leg, having a feeling of stiffness in it. The enormous varicosities of the veins soon became apparent and persisted to the present time. In his work as bartender he was in the habit of resting his weight on his left foot because of the full sensation due to the venous stasis in the right.

Patient dates his present illness from three months ago when the toes of the left foot became quite colorless and numb. The second toe then developed a dark purplish spot near the end next to the great toe, and had a portion of it removed. He was informed by a chiropodist that the toe was gangrenous.

Upon inquiry it developed that for about four years the patient had had severe attacks of pain on the mesial aspect of the great toe, and that it became reddened and swollen during these attacks. These attacks would occur at irregular intervals several weeks apart. There was no feeling of lameness nor weakness in the other parts which would suggest a claudication of the major arteries. About one year ago the little toe of the left foot began to pain, especially under changeable weather conditions. During the attack of especially severe pain he noticed a reddening of the toe. The pain during an attack was at first moderate and steady but gradually became more severe and the skin on the outside became thickened. Thinking it was a corn the

patient began to cut it in April, 1915. He thinks he cut too far and the pain persisted. It was at this time that a chiroprapist was consulted and a portion of the nail of the great toe removed. Soon after this the patient felt a sharp pain radiating intermittently from the little toe to the outer side of the leg and abdomen and genitalia. At the same time he noticed that the veins became very prominent and hard both on his legs and the lower abdomen. His left foot during this period was red and swollen and the whole leg so painful that he could not longer stand or walk and was confined to bed. He complained of a curious tingling and dry sensation in his lip. There was no diarrhea. There was, however, following the eating of some ice cream in May, 1915, an acute gastric attack in which he vomited all night. He was confined to bed for a month, and there was more or less pain in the stomach, of a mild character, during this time.

In July, 1915, a severe sciatic pain, over the left hip, developed, and has persisted to the present time. This pain has ordinarily been more severe than the pain in the foot. About the same time the gangrenous spot on the second toe previously mentioned, developed. Following this all the toes rapidly turned reddish, bluish, then assumed the deep purple, almost black color, which they now present. There has been no pain in the foot since, except when it is depended. Patient has noticed at times a prolonged whiteness and numbness of the fingers after having them in cold water for any length of time.

The patient is a sparely nourished man, with a dry coarse skin, and presenting an appearance of age beyond his years. There are curious brownish macules, about pin-head size, scattered over the skin. The veins over the lower abdomen are prominent, and the right leg is a mass of venous varicosities. The femoral arteries are palpable, but there is no pulsation in the knotted cord which was once the left popliteal artery, nor are the left posterior tibial or dorsalis pedis pulsative. The right foot is cyanosed, and the epidermis of both soles is dry and cracked. The left lower extremity is atrophic and about 3 cm. smaller than the right at corresponding points. This difference is partly due to the varicose, edematous state of the right leg. The left foot in the upper part is cold and pale, the lower part is reddened, while the four outer toes are dry, of a bluish black color, of subnormal temperature, in fact mummified. The great toe is cyanotic with a small bluish area at the tip.

The general vascular system shows a moderate degree of fibrosis but no cardiac disease. The systolic blood pressure in the arms varies from 125 to 160. The viscera present no abnormality. The cerebrospinal fluid and the blood are alike negative. The urine and stool is normal.

The question may properly be raised as to whether the repeated attacks of pain in the great toe over a period of four years, the persistent cold, numb feeling in the fingers after exposure, the dry tingling sensation in the lips, the gastric attack and the final gangrene of the toes, were the result of arterial spasm as is the case in Raynaud's syndrome. But the fibrous state of his general arterial system, the complete obliteration of the left dorsalis pedis and posterior tibial and the nodular cord-like state of the popliteal, together with the unilateral character of the gangrene, though this last is not necessarily an invariable reason, tend to group the case under the obliterative endarteritic group.

DISLOCATION OF THE SECOND CERVICAL VERTEBRA; LAMINECTOMY FOR THE RELIEF OF ROOT PAINS.

DR. ROCHFORD presented from the third division a case of posterior dislocation of the second cervical vertebra with severe root pains promptly relieved by decompressive laminectomy. The patient was an epileptic, 56 years of age, who was admitted to the service of Dr. Bailey on Sept. 10, 1915. About a month before admission, in an epileptic attack, she fell, striking on her neck and head. Directly after recovering from the attack of epilepsy, she experienced severe pain in the back of her neck and over the occipital and mastoid regions. The pain was almost constant and very severe. The slightest movement of her head, the pressure of her clothes, or of the pillow, caused a marked increase in intensity of the pain. When she was admitted to the institute, her head was held rigidly and turned slightly to the left. She was unable to lie down on account of the pain. The right trapezius and sterno-mastoid were very tense and the left muscle slightly so. The spinous process of the second cervical vertebra was very prominent and there was marked tenderness on pressure over the upper three cervical vertebrae. There were no distinct sensory disturbances, but the area of pain corresponded to the distribution of the occipitalis major and minor, and auricularis magnus nerves. There were no spinal cord symptoms. The x-ray examination showed that the second cervical vertebra was dislocated backwards causing a marked distortion of the spinal canal. It was evident that the symptoms were due to traction on the second and third cervical nerve roots. Laminectomy was performed on Sept. 25, 1915, by Dr. Elsberg, the spines and laminae of the second, third, and fourth cervical vertebrae being removed. The spine of the second cervical was much thickened, very prominent and pointed to the left and there was a hiatus of about one centimeter between the articular surface of the first and second vertebrae on the right side. On incision of the dura a large amount of cerebrospinal fluid escaped. There were numerous arachnoid adhesions on the right side which were divided. The cord itself appeared normal. The wound was closed in the usual manner without drainage. Duration of the operation was twenty-four minutes. The condition of the patient at the end of the operation was excellent. Recovery was uneventful. The patient was discharged and has remained well up to the present time. The case is a most unusual one of dislocation of the axis upon the atlas with severe symptoms referable to the second and third cervical roots and without any other spinal symptoms.

UNLOCALIZABLE BRAIN TUMOR; SUDDEN DEATH.

DR. J. L. JOUGHIN presented from the service of the first division, a case of unlocalizable brain tumor. The patient, a female aged 54, had always been in good health until the onset of the present illness which began in May, 1915. Her past history is negative in so far as it relates to her present condition.

In the early part of May occurred the first symptom, a slight unsteadiness in the gait, which at that time incommoded her little but which has slowly progressed until to-day you see her unable to walk except with assistance. A few days later, almost immediately after having her teeth drilled by a dentist, the second symptom developed, an intermittent tinnitus of the left ear, a manifestation which still persists.

On June 15th she was first seen by a physician and from that time until July 29th no very definite change in her condition occurred although locomotion became increasingly difficult. On this latter date she was seized with a violent attack of vomiting accompanied with severe pain in the epigastrium. This was the first of a number of distressing attacks similar in character except that they were unaccompanied by gastric pain. These crises, ordinarily matutinal, were usually induced by the ingestion of food and were often preceded by nausea. Only on one or two occasions was the vomiting projectile in character. They have gradually increased in frequency. Previous to the onset of this illness the family has no recollection of the patient having ever vomited.

Late in July or early in August (it is impossible to determine the period with exactitude) her acuteness of vision began gradually to diminish. It is definitely ascertained, however, that as late as the first week in September she was still able to read the smaller type of the newspapers. Since that time visual acuity has rapidly decreased so that today she can read only with great difficulty heavy block letters one centimeter in height.

During September she complained of severe, lancinating, paroxysmal headaches, localized between the eyes. Rarely were these headaches at the vertex or occipital. These paroxysms often preceded the vomiting and were relieved by it. They have gradually become more severe, possibly more frequent, and now make her life unendurable except in the interval between the paroxysms when she is free from pain.

Weight has been progressively lost, probably largely due to the fact that she voluntarily refrains from eating, owing to the headache and vomiting thus induced. Her mental processes are slowed and the resultant difficulty of comprehension renders it impossible for her satisfactorily to cooperate in her physical examination. Except for this retardation and a little occasional nocturnal confusion her mental condition is unimpaired.

Briefly resumed, her physical status is as follows: Station and gait are both impossible, as she falls when unsupported, though in no particular direction. In walking she slides her feet along the ground, taking always a very small step. All the tendon reflexes are normal. There is neither clonus nor Babinski. The cutaneous abdominal reflexes are probably present though sluggish. Coordination in arms and legs is unaffected. Sensation in all its modalities is apparently normal, and this includes trigeminal findings, although the patient's responses are not always completely satisfactory. Speech is slow but otherwise intact. The sphincters function well, although on one or two occasions since entering the hospital there has been urinary incontinence. The cranial nerves are all intact. There are no cerebellar signs.

The eyes are normal except for a high degree of refractive error (5 to 6 diopters of hypermetropia) and changes noted in the fundus. These fundus changes are papillo-edematous in character and are more marked on the left side than on the right. Although the degree of swelling is at a minimum the diagnosis of papillo-edema can, nevertheless, be made by the obliteration of the normal disc outlines, and the distinct though slight tortuosity of the retinal veins. In order to exclude the possibility of this appearance being due to the marked hypermetropia, the fundus has been examined a second time with

corrective lenses placed before the eyes. This second investigation has confirmed the previous opinion that the changes observed are evidently symptomatic of increased pressure within the cranial cavity. Vision on the left is 20/100, on the right 20/70. The ears have not as yet been examined.

The serological and other laboratory investigations have revealed nothing which can help us from the standpoint of diagnosis, the only abnormal feature being a pleocytosis in the cerebro-spinal fluid of 20 cells per cubic millimeter. The systolic blood pressure has varied between 110 and 130 millimeters.

The case is shown as one of unlocalizable brain tumor, in some respects atypical notably in the early involvement of the gait, the onset of the general symptoms indicative of increased intracranial pressure at a period months later, the marked visual deficit with a very slight swelling of the optic disc, and the possibility that the nerve head changes might be attributed solely to the existing high refractive error.

[NOTE.—This patient was found dead in bed five days after presentation at the above conference. She had been seen by a nurse fifteen minutes previously, who reports that she was apparently in the same condition as she had been throughout her stay in the hospital.

The rapid clinical course, the slight pressure symptoms with late onset, and the sudden death strongly suggest a gliomatous infiltration, the lethal ending being induced by a hemorrhage within the growth. Owing to the absence of an autopsy no definite statement can be made.]

A MIXED VAGOTONIC AND SYMPATHETICOTONIC STATE, IN
A CHILD AGED 5.

DR. GUSTAVE BOEHME presented from the third division L. P., age 5 years, native of United States, of Hebraic extraction.

The patient is an only child. His mother has never had a miscarriage. The father has never had any venereal disease. His birth was normal. The first teeth were erupted at six and one-half months, but at seven months they so interfered with the frenum of the tongue that they were extracted. He walked at twenty months, but fell a great deal. He talked at three years but had used the expressions "papa" and "mamma" at one year.

When one day old he had pneumonia, lasting three days. The mother noticed that when he nursed, his face would redden markedly. At six weeks he had an attack of facial eczema which lasted two months. There then began attacks of bodily and facial twitchings, which have continued to date.

At eight months he again had pneumonia. At eleven months he had measles, of an atypical type, lasting three days. At two and one-half years there occurred a period during which he did not open his eyes for six months. There was no febrile reaction at this time. Recovery was spontaneous.

He has always vomited a great deal, the vomiting being rather of a regurgitating type than of a projectile variety. After all meals he has a marked vasomotor flushing of the face and arms associated with a violent cardiac palpitation. At times the eyes protrude markedly. The convulsive seizures still continue at intervals of three to four months. They are described as a stiffening of the child's arms and legs in flexion with a slight degree of opisthotonus. The child falls if not supported, but

comes to immediately after the mother blows on its face or fans it. Since he has begun to walk, the gait has been on his toes, with the heels rarely touching the ground.

His appetite has always been good. His bowels tend to move freely, but at times there is a slight constipation. Urinary incontinence has been marked, with an appreciable increase in quantity.

To sum up, therefore, we have a child who since birth apparently has suffered from

1. Vasomotor flushes, especially at time of feeding.
2. Tachycardia, especially at time of feeding.
3. Vomiting of a regurgitant type.
4. Hyperidrosis.
5. Urinary incontinence with polyuria.
6. A peculiar gait characterized by toe-walking.
7. Transient attacks of marked exophthalmos.
8. Transient convulsive seizures.

Physical Examination reveals a rather undersized boy with coarse features generally. His hair is dark and rather coarse. His face is slightly cretinoid in type. There is a varying exophthalmos, somewhat more marked at one time than at another. While under examination his face flushes to a bright red, irregularly and patchily distributed. The wrists are also markedly red and hot to touch. The skin varies during examination, at times being very moist, at others dry. The child walks upon its toes, but the condition seems less marked than the mother describes it. If the patient be permitted to eat, the vasomotor flush becomes marked on face, hands and body. There is then marked cardiac palpitation and a tachycardia of from 100-130. The blood pressure varies from 90-100 systolic. The heart is normal. The pupils as a rule are dilated and the eye-slits are widened. The pupils react to light and accommodation. Pressure on the eyeballs does not seem to vary the pulse. The knee, ankle, and arm jerks are normal, as are the superficial reflexes. There is no Babinski or ankle clonus. The tests for cutaneous sensibility, as far as the patient will co-operate, are normal. The lungs are normal. There is no thymic dullness, nor general lymphatic enlargement. The tonsils are slightly enlarged.

Serological findings are negative.

No x-ray of the pituitary region or of the chest was taken.

As to carbohydrate tolerance, this was not undertaken, but it might be mentioned that he has done better under carbohydrate diet.

Therapeutic observations:

Thyroid, gr. half to one three times daily did not change the condition.

Atropin in the form of Tr. Belladonna m. V. t.i.d. brought on an intense vaso-motor flush, marked tachycardia and cerebral excitement.

Epinephrin, gr. 1/200 b.i.d. produced a rather beneficial result. His incontinence was improved, his flushes were much less marked; there were no vomiting and no convulsive seizures. His blood pressure rose to 130. He ate better. This condition lasted for one month, when there was a total relapse, but there was no vomiting. The urinary condition slowly returned.

Pituitary Extract, gr. 1/100 q.d. aggravated his trouble. His flushes were more marked. He could not rest at night. Convulsive seizures returned and there was marked vomiting.

At one time, feeling that there was some spasmophilic tendency, I gave calcium lactate, but with no effect.

A CASE OF PSEUDO-BULBAR PALSY, WITH REMARKS ON THE BULBAR REFLEXES.

DR. J. RAMSAY HUNT presented from the first division a case of pseudo-bulbar palsy with remarks on the bulbar reflexes.

The patient is 60 years old, a carpenter by occupation. He has been intemperate in the use of alcohol. Lues is denied, and the Wassermann reaction is normal.

Onset of the disease, —3 years ago with weakness and numbness of the left arm. The same day the left leg also became involved. A slight left hemiparesis with dragging of the left leg has persisted up to the present time. No disturbance of speech in this attack. He has had occasional vertigo, but no headaches. In July, 1914, three years after the original seizure, he developed suddenly, without vertigo or loss of consciousness, a disturbance in speech (dysarthria) and of deglutition, associated with weakness of the extremities on the right side. With the bulbar symptoms are associated atypical attacks of spasmodic or explosive crying. These always begin with a peculiar feeling of pharyngeal constriction, followed by short spasmodic coughs, filling the eyes with tears, and a spasmodic contraction of the facial muscles of expression. The attack lasts only a few seconds, and as a rule is soon brought under control. At times only the pharyngeal constriction, spasmodic cough and effusion of tears occur, the further extension to the muscles of expression being inhibited. Such seizures occur spontaneously or may be produced by emotional stimuli or by irritation of the soft palate. The vesical and rectal sphincters are normal. There is no pronounced mental deterioration, although his mental processes are not so keen as formerly. Attacks of spasmodic laughter have not been observed.

Physical Examination. A large, well developed man; station normal; gait is slow and somewhat stiff; the left arm is weaker than the right; no atrophy and no fibrillation of the muscles of the extremities, which are slightly spastic, more so on the left side. There is no tremor and no ataxia. The knee jerks are brisk, left greater than the right; achilles reflex active, left greater than right; no clonus. The arm jerks are also lively, more so on the left side. Abdominal reflexes absent, cremasteric reflexes present and equal. Left plantar reflex is of the Babinski type, the right plantar shows extension of the small, but flexion of the great toe. The sensation, both superficial and deep, are normal. The pupils are equal and react promptly. Ocular excursions normal. Facial innervation is equal and normal. Muscles of mastication are strong and prominent. Masseter reflexes exaggerated. Tongue is protruded straight, movements somewhat slow. Innervation of the soft palate is weak, but equal on the two sides. Laryngoscopic examination is negative (Dr. Culbert). Vision and hearing undisturbed. The speech is slow and indistinct and enunciation of words is difficult (dysarthria). There is also a rough laryngeal quality of the tone; some difficulty in swallowing solid food. Corneal reflexes present and normal, the pharyngeal reflex is present but diminished. An unusual sequence of the pharyngeal reflex is its rather frequent emergence into an attack of spasmodic weeping. For example, on irritating the soft palate, as in the production of the pharyngeal reflex, there first occurs a sense of pharyngeal constriction, then a series of explosive respiratory coughing sound,

followed by emotional facial grimaces and lacrimation. At times only the expiratory and coughing element follows the irritation of the palate. Another interesting reflex is evoked by stroking firmly with a tongue depressor the hard palate; this induces quite constantly a slow contraction movement of the left angle of the mouth on the opposite side. This reflex may be elicited with equal facility from either side of the hard palate.

Remarks. This case is presented as an example of pseudo-bulbar palsy, and is interesting from the comparative mildness of the symptomatology. Diagnosis is based on the development of bulbar symptoms with the second attack, the first attack producing merely a slight hemiplegic disturbance, evidences of which still persist. That the pyramidal tracts on both sides are affected is indicated by bilateral weakness and exaggerated tendon reflexes. There is no atrophy of the muscles of the tongue or of mastication, and the extremities are likewise free from evidences of atrophy and fibrillation; so that glosso-labio-pharyngeal palsy and the bulbar type of amyotrophic lateral sclerosis may be excluded. The absence of atrophy is also against the acute apoplectic form of bulbar palsy. Without attempting an exact localization, it may be assumed that there is a double lesion involving the cortico-bulbar tracts on both sides, thus causing supranuclear interference with the bulbar functions (dysarthria, dysphagia and dysphonia). Of a special interest and significance are the explosive outbursts of crying. This emotional motor expression of grief or of joy is a purely automatic function, in which the centers for lacrimation, deglutition, expiration and expression play a predominant role; this mechanism is apparently independent of the higher cortical function, except for certain inhibitory influences.

It is this controlling or inhibitory influence which is disturbed in pseudo bulbar palsy, so that slight impulses of reflex emotional or associated origin may initiate an attack. In severe cases such outbursts may reach the most violent and extreme expression of grief. In the present case it is more subdued and is more readily controlled. It is also of interest to note that the usual pharyngeal reflexes overflow and cause a discharge of this mechanism, as in the case just described. The presence of a slow contralateral reflex contraction of the angle of the mouth on stroking the hard palate, is also to be emphasized, and is probably only another manifestation of the hard palate reflex described by Lach and Henneberg, in which movements of the orbicularis oris follows stroking of the hard palate. Perrero has also described contralateral reflex contraction of the face on stroking the soft palate. Another example of a bulbar reflex is the so-called *fress* reflex described by Oppenheim in Infantile Pseudo-Bulbar Palsy, which consists of a combination of sucking, chewing and swallowing movements after stroking tongue or lips.

The brain stem and basal ganglia, therefore, contain mechanisms which are concerned in the production of rather elaborate and complicated automatic acts, which are controlled by the higher cerebral centers. These furnish important symptoms when the cerebral inhibition is lost, as in pseudo-bulbar palsy, and there is produced as a result explosive laughter and weeping and various types of bulbar reflexes, a return, as it were, to the bulbar condition of infantile life before the inhibitions are developed.

CLINICAL CONFERENCE OF THE NEUROLOGICAL INSTITUTE, NEW YORK.

REGULAR MEETING NOVEMBER 9TH, 1915.

DR. J. RAMSAY HUNT in the Chair.

A CASE OF ACUTE (APOPLECTIC) BULBAR PARALYSIS.

DR. WALTER CLARK HAUPT in presenting this case from the First Division, said that it displayed many unusual features, not the least interesting of which was the possible syphilitic origin of the disease. Furthermore, the question of distinction between true bulbar palsy of vascular origin and pseudo-bulbar palsy comes up, and is not an easy one to decide satisfactorily.

The patient, a widow thirty-two years of age, was admitted on Dr. Collins' service October 28, 1915. She complained of inability to walk unaided, difficulty in standing without support, weakness of her arms, a numb and cold sensation in the arms and legs, and occasional crying and laughing spells.

Her family history records no disease peculiar to her kin. She had measles, mumps and an attack of jaundice as a child. Aside from an operation for varicose veins of the right leg, she never had any serious illness. Menstruation began at twelve and has always been irregular, but not painful. At the age of seventeen, she married a man forty-three years her senior. A year afterward, she bore a child which died when six months old because "the measles would not come out." Her fifth child died at the age of four months of malnutrition. Four of her children are living and well. She lived happily with her husband until about five years ago, when he had a stroke of apoplexy at the age of seventy-four. From that time on, he began scolding and berating her and making life miserable for her.

About the end of July, 1910, there was a violent scene after her husband had accused her of unfaithfulness. He choked her until her older boy hit him over the head with the end of a whip. She was greatly excited and her distress was increased when her husband's relatives accused her of having struck her husband, and threatened her with arrest. She went to bed that night at about eleven, weeping and thoroughly wrought up, but fell asleep in about half an hour. Around midnight she woke up because "her body was burning hot all over." She called to her daughter, got up and sat on a chair until she began to feel chilly, whereupon she returned to bed. She remembers that she was very thirsty at this time. After a few minutes, she found that she could not move her arms or legs; the latter were "stretched out and stiff" her arms were "folded over her breast," her fingers contracted, her tongue was hanging out of her mouth which she was unable to open any further, or close. She had great difficulty in swallowing, choking especially on fluids that were given her. She was unable to speak, but was conscious of everything going on and remembers hearing the doctor say that she would not live until morning.

Three days afterward she was taken to the Hudson Hospital, where her condition gradually improved. Two weeks after entrance she was able to move her arms slightly. After three weeks, her power of speech began to return. All this time her lips felt swollen, her tongue seemed thick, and she had difficulty in moving it. Two months after her attack, she could talk so that one could understand

her, but not for half a year could she talk fluently. For four weeks after her attack, her legs were completely paralyzed; then she found that she could move the left, and a short time later the right one laterally. Her right leg has been much slower in improving than the left. While at the Hudson Hospital, where she remained six weeks, she was incontinent of urine and feces. At the time of her attack she "felt numb all over." Sensation gradually returned to the upper and then to the lower extremities. Up to the present day, her hands and legs feel cold and she often has a sensation of pins and needles in her fingers.

When she left the Hudson Hospital she could neither walk nor stand without support, nor was she able to lift her hands above her head. She gradually became stronger at home, and could stand up while doing a little housework. Though the fingers of her right hand were somewhat difficult to open, she gradually acquired fairly good power of her arms.

Her life has not been happy during the last few years, and she is inclined to be melancholy. She has occasional crying spells over which she does not seem to have control, and at other times bursts of laughter, which are also hard for her to stop.

Physical Examination. The patient is short and rather obese. The hair is scanty, hirsute and pubic hair not abundant. Teeth are carious or absent. Cardio-respiratory system is negative. Blood-pressure, 135. Abdominal examination reveals nothing abnormal.

The pupils are equal in size, irregular in outline, and react sluggishly to light and accommodation. The external ocular movements are normal. There is no nystagmus nor diplopia. Vision and fundi are normal and the fields are complete (Dr. Holden). There is no facial paralysis nor masseter weakness. Examination of the larynx and nasopharynx is negative (Dr. Culbert). The tongue is protruded in the midline and shows no atrophy nor tremor. The palatal reflex as well as Henneberg's sucking reflex are not obtained. On phonation, the excursion of the palate appears somewhat smaller than normal. Patient has no difficulty in swallowing liquids or solids. Her speech is not indistinct and she repeats all test phrases without stumbling.

Her gait is extremely spastic and she has great difficulty in walking, taking very short steps. She cannot stand without support and leans her body forward.

The nutrition of her upper extremities is good and no atrophy can be made out. Range of movement is normal in all directions. Muscular power is only fair, and there is moderate spasticity of the right arm. No tremor, incoordination, astereognosis or adiadochokinesis. There is increased myotatic irritability. The biceps, triceps, periosteal-radial reflexes are all hyperactive. Hoffman's sign is present on both sides.

Abdominal and epigastric reflexes are not obtainable.

In the lower extremities the nutrition is good, and there is no local wasting or atrophy. Both legs are in a markedly hypertonic state, the right more so than the left. Flexor and extensor muscles both of thighs and legs are spastic. There is distinct adductor spasm. Myotatic irritability is increased. No fibrillary twitching or tremor are seen. The patient can elevate the left leg from the bed to an angle of 30°, the right one-half that distance. At the knee joint flexion and extension are greatly limited.

The right leg can be flexed only about 10° and the left about 30°. Range of movement at the ankle joint is also limited, and this is again more marked on the right. The toes are the only part of the lower extremities which she can move freely. Of the tendon reflexes, the knee and ankle jerks are exaggerated. Plantar stimulation gives first an extensor then a flexor response. The Babinski and Oppenheim phenomena are present on both sides. There is a double inexhaustible ankle clonus. Patella clonus is not obtainable on account of the marked spasticity.

There are no objective sensory disturbances; perception of tactile, painful and thermal stimuli being equal and normal everywhere. There is no loss of postural sense either in the upper or lower extremities.

Examination of the blood, urine, gastric contents and feces are reported normal. Dr. Kaplan found the Wassermann reaction of the blood serum positive on two occasions, while it was reported indeterminate in Dr. Ferdyce's laboratory. The cerebrospinal fluid has been negative throughout on two occasions.

The electrical reactions of the muscles of both the upper and the lower extremities were found to be normal. All muscles respond actively to Faradism except the right soleus and gastrocnemius where the reaction was not complete, probably due to operation scar tissue. The response to Galvanism was normal everywhere except for the shoulder muscles, where it is diminished, probably on account of the thick covering of adipose tissue. The reaction of degeneration was nowhere demonstrable.

Summary. After enjoying twenty-seven years of ordinary good health, the patient suddenly developed, subsequent to severe emotional strain, a glosso-pharyngo-labial paralysis with spastic paraplegia of all four extremities. The symptoms began to disappear two weeks after onset. No further improvement took place after one year, and the condition has remained stationary for about four years, the residuum of her attack consisting of a spastic paralysis of both lower extremities, moderate spasticity of right arm, fatigability of both upper extremities, paraesthesiae in both arms and legs, and occasional spasms of wheezing laughter and crying spells. The positive findings on physical examination are: Sluggish, irregular pupils, slightly diminished excursion of palate on phonation, absence of palatal reflex and of Henneberg's sucking reflex, spastic gait, inability to stand without support, diminished muscular power of upper extremities, exaggerated reflexes, spasticity of right arm, increased myotatic irritability, bilateral Hoffman's sign, absence of abdominal and epigastric reflexes, marked spasticity of lower extremities with greatly diminished muscular power, exaggerated knee and ankle jerks, double Babinski and Oppenheim, double inexhaustible ankle clonus, positive serum Wassermann.

The sudden development of a glosso-pharyngo-labial paralysis, associated with paraplegia of all four extremities, and especially the subsequent regressive course of the disease, mark this case as one of acute (apoplectic) bulbar paralysis. The positive character of the Wassermann reaction points to a luetic origin of the trouble, possibly a syphilitic endarteritis of the basilar artery, as Oppenheim explains cases of this character, ascribing the sudden apoplectic form onset of the symptoms to a transient complete obstruction of that vessel, and

attributing the regressive course of the disease to a restoration of the circulation before death of the tissue has occurred.

In many cases, the differential diagnosis between acute bulbar paralysis and pseudo-bulbar palsy is difficult, as the symptoms of the two syndromes are essentially the same. In this case, however, there are certain factors which enable us to exclude one disorder in favor of the other. In the first place, the symptoms of pseudo-bulbar palsy usually develop in the course of several apoplectic seizures, and hardly ever come on in a sudden attack as in this case. Furthermore, in the great majority of cases of pseudo-bulbar palsy, there are present signs of general arteriosclerosis which are not observed in this patient. Lastly, pseudo-bulbar palsy does not show the regressive course which the symptoms in this case have taken, and which is observed in the less severe cases of acute bulbar paralysis that do not end fatally within a few days, due to bronchopneumonia or paralysis of the respiration and heart.

The sudden onset of the symptoms in one apoplectic attack, the absence of signs of general arteriosclerosis and the regressive course of the symptoms, speak in favor of acute bulbar paralysis, the probable etiological factor in this case being a transient thrombosis of the basilar artery, on the basis of a luetic endarteritis.

SUB-ACUTE COMBINED SCLEROSIS OF OBSCURE ETIOLOGY.

DR. WALTER TIMME presented from the third division a tailor, 48 years of age, married, with five children, all well, who entered the hospital on November 5th, 1915, with the following history. Some six months ago he was compelled to close his shop in a fashionable neighborhood of Paris on account of the war. This entailed a considerable loss of money, the loss of a well-established business, and an intense mental shock. Shortly thereafter, he began to notice a weakness in both legs, and various paraesthesiae in both feet. This condition gradually got worse and he came to America hoping to begin anew, and at the same time improve his health. He obtained employment here, but his condition grew from bad to worse until now he cannot walk nor stand, but has pain and stiffness in both legs, with no actual sphincteric trouble. His examination upon entrance showed that he could neither stand nor walk, that he had marked spasticity of both legs with a double Babinski, Oppenheim and Gordon, double ankle and patellar clonus, with of course extremely hyper-acute tendon reflexes. The abdominal, epigastric and cremasteric reflexes are absent. His pupils are irregular, somewhat unequal, practically fixed to light, reacting slightly to accommodation; of true Argyle-Robertson type. His tongue deviates slightly to the left and he has had an occasional diplopia. He has some subjective sensory changes, in addition to the paraesthesiae already mentioned, in both fingers and toes, namely, a well-marked girdle sensation at about the 12th dorsal distribution. Since coming into the Institute he has been running a low temperature, highest in the evening, varying between 98 and 101 degrees. His blood and spinal fluid are entirely negative as to the Wassermann reaction, cell count and globulin. His urine shows a slight trace of albumin. His blood examination shows the following: there are but 2,700,000 red cells, some of which show stippling and others show signs of degeneration. The differential white cell count is

practically normal. The case is, therefore, in all probability, one of sub-acute combined sclerosis.

These cases of combined sclerosis are fairly numerous in the literature. They have usually arisen after severe shock or fright, after prolonged exercise, but chiefly after infectious systemic diseases, such as typhoid, malaria, diabetes, pernicious anemia, a host of others, less well defined. The fact that the present patient has a blood condition of pernicious anemia, and is running a temperature of low degree, may put him in a group in which a chronic malarial or other cachexia has produced a blood picture of pernicious anemia. Another fact which ought to be considered in conjunction with these two debilitating ones, is the intense mental anxiety and strain, and deep disappointment and discouragement entailed by the loss of his business and savings in Paris, as a result of the war conditions. The Argyle-Robertson pupil present in this case is a factor difficult of explanation, in light of the three separate negative syphilitic findings in his blood and spinal fluid, at three different periods in the course of his disease. Yet a similar pupillary picture in non-luetic cases has been seen by other observers, notably, Marburg, Oppenheim, and Frankl-Hochwart. Whether the phenomenon is due to direct involvement of the ciliary ganglia, or else to the condition of the cord at the level of the cilio-spinal centres, is a moot point.

The progress of the case will be further reported.

ACUTE DISSEMINATED MYELITIS, FOLLOWING ACUTE STREPTOCOCCUS INFECTION OF THE EAR.

DR. J. RAMSAY HUNT presented from the second division, a woman thirty-five years of age, a domestic servant by occupation. Her previous history is negative and without especial interest. She was in excellent health until April 1st, 1915, when the right ear became painful following a "cold." The pain in the ear was very severe for two weeks, and was then followed by a purulent discharge from the canal. On the appearance of the discharge, the pain diminished in severity. After the ear had discharged for about three weeks, the flow suddenly ceased, the pains in the ear and mastoid returned and became increasingly severe, and she applied to the New York Eye and Ear Infirmary for treatment. She was admitted to the service of Dr. Gorham Bacon on May 11th, 1915, a diagnosis of acute mastoiditis was made and operative treatment recommended. On May 13th, Dr. Saunders performed a mastoid operation which included exposure of the sinus, and a considerable area of *dura mater*. Bacteriological examination of purulent matter removed from the mastoid cells, showed the presence of numerous colonies of *streptococcus longus*.

On the fourth day following the operation, she complained of indefinite pain in the back and lower extremities, followed by weakness and paraesthesia of the trunk and legs. These symptoms were accompanied by fever and chilly sensations. Examination at this time showed weakness and ataxia, and she was unable to stand or walk without assistance. Blood cultures made on May 18th, 1915, were quite negative. The cellular constituents of the blood showed marked changes: Red cells, 2,900,000; white cells, 5,000; hemoglobin, 45%. Differential count as follows: Small mononuclears, 61%; large mononuclears, 4%; polynuclears, 34%; eosinophiles, 5%; mast cells, 5%. The red corpuscles were irregular in size with clear central areas. The urine was

normal. Pains in the lower extremities continued and soon extended to the neck and arms, especially on the right side. There was also a painful girdle sensation at the umbilical level, and a sense of constriction about the neck. Vesical symptoms and difficulty in defecation were also present. There was some headache low down in the occipital region, but no vertigo, delirium, or other central symptoms.

The mastoid wound healed without complication, but the spinal symptoms persisted and for a time increased in extent and severity.

Neurological Examination. On June 16th, 1915, I first saw the patient at the request of Dr. Bacon and Dr. Saunders. She was then almost paraplegic and unable to stand without assistance. There was marked static ataxia (Romberg symptom). She complained bitterly of pain in the neck and lumbar region, and there was a painful sense of constriction around the waist, with paraesthesia of the hands, and both lower limbs to the knees. The motor power of the arms was undisturbed and there was no ataxia or tremor. The knee jerks and achilles jerks were exaggerated, and there was a tendency to ankle and patellar clonus on both sides. The abdominal reflexes were elicitable, and the plantar reflexes were much diminished and of the flexor type.

There was marked disturbance of sensibility, both superficial and deep, of the lower extremities.

The pupils were equal and reacted to light and accommodation. Vision and the optic nerves were normal and there was no nystagmus or paralysis of cranial nerves. Articulation was not affected.

At this time (June 16, 1915,) a Wassermann test of both the blood and spinal fluid was negative, and there was no increase of the globulin content or of cellular elements. A blood count at the time showed some improvement over that taken on May 18, but there was still severe anemia: Red cells, 2,160,000; white cells, 4,000; haemoglobin, 70%. Differential count: Small mononuclears, 53%; large mononuclears, 10%; polynuclears, 36%. One nucleated red cell was found.

The diagnosis was made of a spinal cord affection, probably a myelitis of infectious or toxic origin. She remained in the Infirmary until August, 1915, without material change in her condition, and was then transferred to the New York Neurological Institute, and was admitted to the Second Division.

Her complaints on admission were as follows: Pain in neck and dorsal region, with broad girdle sensation about the chest and upper abdomen. Pain and painful paraesthesia of the lower extremities and to a lesser degree of the arms, especially the right. Rather a constant area of pain in nape of neck extending to the right shoulder. Occasional incontinence of urine and also of faeces after laxatives. Inability to stand or walk. There is no complaint of headache, vertigo, diplopia, nor visual disturbance. Her mind is perfectly clear.

Examination. August 8th, 1915. The patient is bedridden and incontinent. No decubitus. Pupils are equal and react to light and accommodation. No nystagmus.

The cranial nerves, including the optic discs, are negative.

The spinal column shows no deformity, but there is some tenderness on pressure at the level of the 4th D. and 8th D. spines, and there is very slight stiffness of the neck. Movements of the arms are

free and there is no ataxia or tremor. The grip of the right hand is somewhat weakened, and the right arm is the seat of pain and paraesthesia, but without gross disturbance of sensation. The tendon reflexes of the upper extremities are present and not exaggerated.

Both lower extremities are spastic and paretic, the right more than the left. There is well-marked patellar clonus and ankle clonus on both sides. The plantar reflexes are of the extensor type (Babinski). The abdominal reflexes are absent.

The postural sense of the toes is disturbed on both sides and the superficial sensibility, touch, pain and temperature, is diminished or lost in irregular areas below the umbilical line, above which there is a broad zone of hyperaesthesia.

On August 8th, 1915, the Wassermann tests of the blood and cerebrospinal fluid were again negative, and there was no increase of globulin or of cells. The urine was negative. An examination of the blood on November 6th, 1915, showed 4,782,000 red cells with 70% of haemoglobin. While under observation, there had been no fever and the examination of the internal organs, heart, lungs and abdomen, showed no abnormalities.

Comment. The patient remained in the Institute three months, during which time there was a gradual abatement of the subjective symptoms, with some return of power in the lower extremities. When discharged, November 15, 1915, there was still spastic paraplegia with paraesthesias and a girdle sensation. The spinal cord symptoms had, however, shown a distinct improvement, no new symptom had developed and the tendency was to retrogression, and not progression of the disease. There was, therefore, every reason to hope, that the inflammatory process had been checked by the defensive forces of the body, and that eventually, those neural structures which had suffered, would gradually recover a considerable portion of their function. It is probable, however, that some weakness and spasticity will persist as a result of permanent injury to the pyramidal tracts.

As the spinal cord symptoms had followed so soon after the operative procedure, it was thought likely that the organisms (streptococci) or their toxins, had entered some of the venous channels, thus reaching the general circulation. Just why the hematogenous infection should have become localized in the spinal cord, is as much of a mystery in this case as in other of these obscure selective forms of inflammation. The possibility of a direct infection of the subdural space was also considered, with secondary invasion from the cerebrospinal fluid of the *medullae spinalis*. Such an invasion of the cerebrospinal fluid would be much more likely to cause meningitis with the clinical and pathological features of this disease, and while it is true that slight meningeal symptoms were noted, as spinal pain and some stiffness of the neck, yet these were not more acute than are commonly observed in myelitis, and the fluid obtained by lumbar puncture was free from any signs of inflammatory reaction.

The extreme degree of the infective and intoxication process, is shown by the severe secondary anemia which was present. That this was merely a secondary anemia, was evidenced by the marked improvement in the blood picture, after the subsidence of the infection, and the funicular myelitis associated with pernicious and other grave anemias may, therefore, be excluded.

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MODERN PROBLEMS IN OBSTETRICS.

THE modern development of obstetrics, like that of other branches of medicine, has not resulted in the establishment of a stereotyped science or art. Classic operations and modes of procedure, it is true, have acquired a recognized position in obstetric practice; but there has been no tendency for the subject to become stationary. On the contrary, with the constantly broadening general scope of medicine, new conceptions and modes of regard have arisen in obstetrics which lead to constant progressive variation in its purposes, methods, indications and technic. New advances in scientific knowledge in other fields are extended and applied in the field of obstetrics with analogous results in progress to those following the introduction of surgical anesthesia and the recognition of the bacterial etiology of inflammatory disease. With these constant advances there arise constantly new problems, in dealing with which the clinical experience and experimental investigation of modern obstetrics are concerned.

In the present issue of the JOURNAL, which is published as an obstetric number, we take pleasure in presenting a series of papers dealing with various aspects of two of the more important of these modern problems in obstetrics,—Caesarean section and obstetric anesthesia. *A priori* it might seem that Caesarean section were an operation likely soon to become stereotyped in its performance and application; yet in point of fact it is a procedure whose more extended use has given rise to wide divergences of opinion relative to its indications and its technic. The three articles on Caesarean section which compose the symposium on that subject in this number are striking illustrations of the important differences that may exist in the theory and in the practice of earnest and successful clinicians in the same field of medical activity.

It is undoubtedly true that in recent years there has been a rapid extension of the field of indications held to justify the performance of Caesarean section. Indeed it has even somewhat fantastically been suggested that Caesarean section may become an almost universal procedure, normal labor remaining as a rare and accidental phenomenon. Though this result is, of course, not to be considered seriously, such a change in the methods of human life would be hardly more radical than others that have been successfully and advantageously adopted, such as the use of clothing, the cooking of food and the assumption of the erect posture. Caesarean section has not yet been long enough in employment for us to ascertain or appreciate the hereditary effect which it may have upon human structure by enabling the survival of dystocic stocks that otherwise and hitherto have been constantly and relentlessly eliminated by natural process. It is known that morphologic evolutionary changes may occur under favoring conditions within a relatively short time; and it is conceivable that after several generations of Caesarean section in a given family the possibility of normal labor may become completely and permanently eliminated. Such consideration, however, is purely speculative and theoretic and does not concern the question at issue. The problem of Caesarean section to-day is to determine the field of its legitimate present indication, not to contemplate the possible future development of the procedure. Obstetrics will not differ from other branches of modern medicine if it alters the course of evolution by encouraging the survival of forms which

under earlier conditions would have been rigorously and automatically condemned as unfit.

The subject of anesthesia in obstetrics presents another important problem which in recent years has been extensively and conspicuously discussed, by the laity as well as by the profession. The exploitation of so-called twilight sleep in the popular press has probably done a certain measure of harm; for its consideration as one of the methods of obstetric anesthesia legitimately belongs in professional publications. Dr. Brant in his article on anesthesia in obstetrics, reviews, summarizes and compares various anesthetic methods at the disposal of the clinician and states clearly his views as to the indication for their employment. Dr. Irving in the succeeding article presents a detailed exposition of his technique and experience in the employment in obstetrics of one of these methods, that of nitrous-oxide gas and oxygen.

There is, of course, vastly more to be said on the subjects, both of Caesarean section and of obstetric anesthesia, than could be included in a long series of issues of the JOURNAL. It is hoped that the selected papers presented in this number may be of interest not only to obstetric specialists but to those general practitioners who compose the vast majority of obstetricians; and that they may prove also a useful contribution to the growing literature and discussion of these modern problems in obstetrics.

DECREASE OF TYPHOID FEVER IN CALIFORNIA.

In a paper read November 9, 1915, and reported in the *California State Medical Journal* for March, 1916, Dr. Wilbur A. Sawyer, secretary of the California State Board of Health, gave some interesting and stimulating details regarding the campaign against typhoid fever in that state during the last eight years. Owing to many circumstances, of which not the least was the difficulty of getting full reports of non-fatal cases, he concluded that for the present the only reliable gauge of progress in typhoid prevention was the typhoid death rate. The death rate from typhoid per 100,000 population fell steadily in these eight years from 32.2 to 13.6, a reduction of 58%. After the reading of the paper, but previous to its publication, fuller figures for 1915 showed that the actual death

rate from typhoid in that year fell to a point between 9.6 and 9.8 per 100,000. This neatly capped the determination expressed in Dr. Sawyer's paper, that the death rate from typhoid in California would be reduced to a figure below 10 per 100,000 within the next four years. So comes an excellent illustration again of what careful and scientific public health work can accomplish, and how results may easily exceed the most sanguine expectation.

The final figures for 1915 gave a total reduction in death rate from typhoid in nine years of 70% and over the preceding year of 29%.

Sawyer quotes the statistics of the U. S. Bureau of the Census for 1913, the latest available source, showing that in the registration area of the United States, twelve states had a poorer rate than California and eleven a better. The highest was 57.4 in North Carolina and the lowest 7.8 in Vermont. Five states only had death rates for typhoid lower than 10, these being Vermont, Massachusetts, Rhode Island, Wisconsin and New Jersey. California has now joined this enviable group and is planning to proceed still further. Sawyer points out that it becomes increasingly difficult to lower the rate as it approaches zero, yet the effort to control this absolutely preventable disease is one of the finest lines of progress made in modern medicine. The California Board of Health has inaugurated a special campaign for sanitation and typhoid safety in the regions of the great national parks and play-grounds in the state, which are visited by thousands of people from other districts each year. A more efficient determination is also planned to locate the actual place of infection in each case of typhoid to facilitate intensive eradication.

The lowering of the incidence and mortality from typhoid is certainly a matter in which there may be a beneficial competition between states, and it should be a matter of reproach to any state, as to any community, to stand low in such a list.

DIPHTHERIA IN NEW YORK CITY.

A RECENT number of the weekly bulletin of the Department of Health of New York City (Feb. 19, 1916) contains an interesting résumé of the incidence and mortality from diphtheria in the year 1915. A comparative table is given

showing that while there were reported in the years 1907 to 1915, inclusive, 280,078 cases of measles with 6,630 deaths, a percentage of 2.4, and 131,925 cases of scarlatina with 6,474 deaths, a percentage of 4.7, there were 138,042 cases of diphtheria with 13,435 deaths, or a percentage of 9.7. This persisting high death rate from diphtheria and its continuing higher mortality than measles and scarlatina, are worthy of remark.

It is pointed out that since the introduction of antitoxin and its attendant marked fall in mortality rate, there has been practically no change in the death rate from diphtheria. This is ascribed to the fact that the average practitioner does not give antitoxin on the first day of the disease, or as soon thereafter as he sees the case, in spite of the fact that given on the first day there is practically no mortality. Along with this is a failure of the practitioner to make sufficient throat cultures and with proper care for diagnosis. Prompt diagnosis and immediate isolation of contacts and suspects will go far toward reducing the case incidence, as the prompt and adequate use of antitoxin will go far toward reducing the mortality.

The report calls deserved attention to the importance of the Schick intra-dermal reaction to determine the degree of immunization of contacts. With prompt handling of the actual case, and the determination of all contacts whose immunity is low, the quarantine of the disease becomes really accurate. In the use of toxin-antitoxin mixtures for immunization there is much to be hoped for securing finally a means of practical immunization. The administration is effective as a prophylactic for only a few weeks.

For the year 1915 there were 15,572 cases reported with 1,278 deaths, or a mortality of 8.2% as compared with 17,130 cases and a mortality of 8.7% in 1914. In the Diagnosis Laboratory there were examined 51,517 primary throat cultures, of which 8,340 were found positive. Less free antitoxin was distributed in 1915 than in 1914.

The point is worthy of emphasis that in spite of a ready means of accurate diagnosis, and in spite of the availability of a specific cure, the case incidence and case mortality have not shown a greater decrease. This is a matter which can be put squarely back on the practitioner, and it is up to him to make use of the scientific weapons available.

BOYLSTON MEDICAL PRIZES.

For many years, indeed since its foundation in 1826, the Boylston Medical Prize has been one of the most notable prizes in medicine in this country. Until lately this prize has been awarded annually and has carried a premium of \$75. Recently, however, its administration has been so changed that it is now offered triennially with an honorarium of \$300 and the new Boylston Prize Medal which has been made to take the place of the original medal, the die of which was cast at the British mint in London, but which disappeared many years ago and was apparently lost in the Boston fire. The new medal will be of gold, and will be awarded only in case the winning essay shows especial originality in the investigations detailed.

For 1915 the Boylston Prize has been awarded to Dr. Wilson G. Smillie of Cambridge, Mass., for an essay entitled "Studies of the Streptococcus of Smith." For 1918 the prize is offered for the best dissertation on the results of original research in medicine, the subject to be chosen by the writer. Dissertations entered for this prize must be in the hands of the secretary on or before December 31, 1918. This prize is open to public competition. The further conditions upon which the prize is awarded are as follows:

"In awarding these prizes, preference will be given to dissertations which exhibit original work, but if no dissertation is considered worthy of a prize, the award may be withheld. Each dissertation must bear, in place of the author's name, some sentence or device, and must be accompanied by a sealed packet, bearing the same sentence or device, and containing the author's name and residence within. *Any clue by which the authorship of a dissertation is made known to the Committee will debar such dissertation from competition.* Dissertations must be printed or typewritten, and their pages must be bound in book form. All unsuccessful dissertations are deposited with the Secretary, from whom they may be obtained, with the sealed packet unopened, if called for within one year after they have been received. By an order adopted in 1826, the Secretary was directed to publish annually the following votes:—

"1. That the Board does not consider itself as approving the doctrines contained in any of the dissertations to which premiums may be adjudged.

"2. That, in case of publication of a successful dissertation, the author be considered as bound to print the above vote in connection therewith.

"The Boylston Medical Committee is appointed by the President and Fellows of Harvard College, and consists of the following physicians: William F. Whitney, M.D., Chairman; Harold C. Ernst, M.D., Secretary; William T. Porter, M.D., Edward H. Nichols, M.D., Reid Hunt, M.D., Henry A. Christian, M.D., John Warren, M.D.

"The address of the Secretary of the Boylston Medical Committee is Harold C. Ernst, M.D., Harvard Medical School, Boston."

MEDICAL NOTES.

FIRST UNIVERSITY DENTAL SCHOOL IN NEW YORK FOR COLUMBIA.—Realizing the importance of the teeth and mouth infections to systemic disease, the Faculty of the College of Physicians and Surgeons have unanimously voted in favor of the establishment of a dental department, to be connected with the medical school. A committee of prominent dentists of the city have presented plans to the Medical Faculty which have been approved.

The school of dentistry will be closely associated with the medical school and the admission requirements will be the same as the medical. The course will be four years, the first two years the same as those in medicine, thus giving the dental student a thorough knowledge of the fundamental sciences necessary to the practice of a specialty of medicine. At the end of the second year the dental student will give all his time to the study of dental subjects, namely, operative dentistry, prosthetic dentistry, oral surgery and oral pathology, orthodontia, etc., and the more technical part of the work required for the well trained dental surgeon. This new school will be the first university dental school in New York City and the second in the state. It will give the first four-year course of dentistry ever given in the Empire State.

THE EXAMINATION OF CHILDREN IN TRADE SCHOOLS.—Through special arrangement with a representative of the Department of Education in New York City, the Occupational Clinic at 49 Lafayette Street, is now conducting physical examinations of girls who are serving an apprenticeship in the Department of Education's extensive trade rooms for industrial workers. The girls in this school remain but a short period, and each week a number of new applicants are initiated into some special vocation such as millinery, dressmaking, designing, etc., to ascertain the aptitude and suitability of the girls for particular vocations. As soon after they are admitted as possible, the girls are sent to the Occupational Clinic of the Division of Industrial Hygiene, and a physical examination is made to discover whether they show any

physical defect of a character which would disqualify them for such vocation as they may tentatively have selected. It is intended to discover whether these girls are unfitted by a cardiac, nervous or orthopedic defect for entering a trade that would tax their physical capacity, and to assist the instructors to guide them into vocations which are compatible with their physical state.

If this sort of coöperation between educators and physicians to guide those on the threshold of industrial life in a selection of a trade in which the strains and demands are of a character that the individual is mentally and physically adapted to meet is developed, as it should be, a conservative system will have been introduced into the industrial world. At present children are guarded and guided while at school and until they receive working papers; after this, they pass beyond medical control and supervision. The department now inaugurated in coöperation with the Department of Education, may open up a wide field to extend the supervision over minors who enter the industrial field, and thus continue the state's medical guidance to cover an additional important period of the life of our young citizens.

LONDON DEATH RATES IN JANUARY.—Statistics recently published show that the total death rate of London in January, 1916, was only 13.5 per thousand inhabitants living. Among the several districts and boroughs the highest rate was 19.9 in Shoreditch, a crowded East Side slum, and the lowest was 10.3 in the old City of London. It is surprising that the two extreme rates should have occurred in adjacent districts.

TYPHUS FEVER IN MEXICO.—Twelve cases of typhus fever have been reported in Texas. These cases have occurred mostly at Mexican border points.

APPROPRIATIONS BY THE ROCKEFELLER FOUNDATION.—The Rockefeller Foundation has recently made appropriations amounting to \$1,200,000 for various branches of its activities. These cover the work of the department recently established at Princeton, N. J., the study of animal diseases, the Union Medical College in Peking, China, the aiding of the hospital work of Alexis Carrel in France and of the prison camps of Europe. The Rockefeller Institute has recently sent Dr. Alvin W. Struse of Philadelphia to the tropics to make a general survey and study of tropical diseases and of snake bites and poisons in India. He will be associated with Dr. Victor G. Heiser of the Philippine Islands. Dr. Struse will visit the Hawaiian Islands, India, the Fiji Islands, the Federated States, Australia and the Island of Ceylon, spending at least two years in the study.

WAR RELIEF FUNDS.—On March 25 the totals of the principal New England relief funds for the European War reached the following amounts:—

Belgian Fund	\$108,962.93
Serbian Fund	84,506.46
Allied Fund	68,703.30
French Wounded Fund ...	64,039.85
Armenian Fund	35,662.16
French Orphanage Fund ..	34,041.09
Polish Fund	26,765.90
Surgical Dressings Fund ..	20,886.17
La Fayette Fund	19,635.53
Italian Fund	16,525.35
P. S. D. Fund	6,024.45

BOSTON AND NEW ENGLAND.

THE WEEK'S DEATH RATE IN BOSTON.—During the week ending March 25, there were 234 deaths reported, with a rate of 16.05 per 1,000 population as compared with 273 and a rate of 19.02 for the corresponding week of last year. There were 34 deaths under 1 year as compared with 36 last year, and 77 deaths over 60 years of age against 90 last year.

During the week the number of cases of principal reportable diseases were: Diphtheria, 48; scarlet fever, 70; measles, 151; whooping cough, 38; typhoid fever, 1; tuberculosis, 32. Included in the above were the following cases of non-residents: Diphtheria, 12; scarlet fever, 23; whooping cough, 1.

Total deaths from these diseases were: Diphtheria, 1; measles, 1; scarlet fever, 1; typhoid fever, 1; tuberculosis, 17. Non-residents included in the above: Typhoid fever, 1; tuberculosis, 1.

MONSON STATE HOSPITAL.—The report of the trustees of the Monson State Hospital covering the year ended November 30, 1915, states that the average number of patients cared for was 974, the number of discharges 85, and the number of deaths 69. An out-patient department has been opened in connection with the regular work of the hospital. A representative of the medical staff is at the Academy of Medicine in Springfield on the first and third Wednesdays of each month, at Greenfield Hospital on the second Monday of each month and in Pittsfield at the House of Mercy on the last Thursday of each month.

BRAIN SYPHILIS IN INSANE HOSPITALS.—On November 3, 1915, the Massachusetts State

Board of Health appointed Dr. Harry C. Solomon as special investigator of brain syphilis and the March bulletin (No. 19) of the Board records progress in his work up to March 1. At the Danvers State Hospital there are being treated eight cases of brain syphilis diagnosed as general paralysis. On the first of December the Westborough State Hospital began treatment with one case. Since then they have treated five more cases with intraspinal and mercurial serum and several cases with salvarsan substitutes. At Taunton State Hospital two cases have recently been taken under treatment with a drug furnished through the courtesy of Dr. Danyasz of the Pasteur Institute of Paris. This drug goes under the trade name of "Luar-gol," and is a compound of dioxydiaminoarsenobenzol with bromide salts of silver and antimony. Wassermann specimens had been previously taken of 1,000 cases at the Massachusetts School for the Feeble-minded at Waverley, and the entire population has now been examined, and, in addition, the cerebrospinal fluid in all cases that had positive Wassermann reaction. Twelve are being given treatment, six with salvarsan and six with salts of mercury. Three cases at Worcester State Hospital are being treated with arsenobenzol, which is the American substitute for salvarsan. At the Medfield State Hospital five cases are receiving intravenous arsenobenzol, several are receiving intravenous injections of mercury and a group of latent syphilitics are receiving intramuscular injections of mercury. Patients are being treated at Boston State Hospital with intravenous arsenobenzol, intraspinal mercurialized serum and intraspinal arsenobenzolized serum. There are thirty-six cases of brain syphilis being treated at the Psychopathic Department.

OCCURRENCE OF ANTHRAX.—Several cases of anthrax recently occurring in Woburn, Chelsea and Peabody have called attention to the great danger of contraction of the disease which has sprung up since the opening of the European War. The infected hides come to this country, for the process of tanning, from China and India. They were formerly tanned in Germany and it is only since the outbreak of the war that the disease has become dangerous in this country. In Woburn the disease has occurred in two tanneries and two deaths have resulted, although the tannery using the greatest number of Chinese hides has had no fatalities. An employee in a Chelsea tannery has died at the Massachusetts General Hospital and three more cases are being treated there. Both the State Department of Health and the local health officials are making every effort to control the disease. Two additional cases of anthrax were reported at Woburn on March 24.

FINANCIAL STATUS OF DISPENSARY PATIENTS.—The Boston Dispensary reports its results of

an investigation of the wage earning capacity of its patients. The following figures are given:

"Fully three-fourths of all our patients belong to family groups, and more than three-fourths of these families have but one wage earner. Thirty-seven per cent. of families live on \$600 or less, 49% on \$700 or less, 70% on \$800 or less, 77% on \$900 or less, 83% on \$1000 or less per annum; 3% are dependent on charitable relief; 14% have over \$1000, i.e., not more than 1400 new families a year have more than \$1000, while 8000-9000 have less than \$1000.

"Among those listed as 'unmarried,' about 4000 new patients a year, 78.6%, are living on \$600 or less a year, i.e., only between 700-800 unmarried applicants out of 4000 earn over \$12 a week.

"It is a general opinion among students of wage-earners' budgets that even small families in this vicinity living on \$1000 or less a year should not be expected to purchase more medical service than that necessary to childbirth and acute illness in the home."

NEW ENGLAND BAPTIST HOSPITAL.—The 22nd annual report of the New England Baptist Hospital, Boston, records a total of 742 patients treated for the year ended December 31, 1915. Seventy-five of this number were medical cases, 546 surgical cases and 87 maternity cases. There were 226 major operations performed and 271 minor operations. The training school numbers 26 nurses. Ten nurses were graduated during the past year.

APPOINTMENTS IN THE MEDICAL RESERVE CORPS.—The following Boston doctors have been nominated by President Wilson to the rank of first lieutenant in the Medical Reserve Corps: Gardner Nathan Cobb, Horace D. Arnold, Alexander S. Begg, John Warren, Frank P. Williams, Z. B. Adams and Elliot G. Brackett.

BEQUEST.—By the will of the late Edward Everett Allen of Watertown, Mass., the Boston Floating Hospital is the recipient of \$500, and the Watertown District Nursing Association, \$1000.

Massachusetts Medical Society.

IMPORTANT LEGISLATION.—The enemies of public health are making a desperate attempt to break down our vaccination and legislative laws. House Bill 1088, that unvaccinated children may attend public schools, is now in the Legislature. House Bill 1091, giving exemption from registration, and 1093, on the practice of mid-wifery, may be reported at any time. Members of The Massachusetts Medical Society should see their senators and representatives immediately and secure their influence against these measures.

CHARLES F. WITHERINGTON, President.

Obituary.

SILAS ARNOLD HOUGHTON, M.D.

Dr. SILAS A. HOUGHTON of Brookline, Mass., died Sunday, Feb. 6, of pneumonia, after an illness of less than a week. He was born in Keeseville, N. Y., September 11, 1864, was prepared for college at the Boston Latin School, entered Harvard College in 1883, and graduated four years later, having laid the foundation among his classmates for their future lasting regard. He entered the Harvard Medical School, receiving his degree in 1891. He thereafter served as house officer at the Boston Lying-in Hospital and at once began the practice of medicine in Brookline, for a time being associated with Dr. George K. Sabine of that town. Dr. Houghton was married in 1897 to Miss Margaret S. Beckwith of Plattsburg, N. Y., who, with two children, a son and a daughter, survives him. He was a member of the American Medical Association, the Massachusetts Medical Society, the Boston Obstetrical Society, the Boston Medical Library and, at the time of his death, was one of the officers of the Harvard Medical Alumni Association.

Dr. Houghton was widely known in the community in which he practised as a physician of judgment and conservatism, never led away by the vagaries into which medical practice is at times liable to wander. He was, perhaps, especially known as an obstetrician of unusual skill, although he never devoted himself solely to this branch of practice. Of late years, in fact, the exigencies of his general work and the necessity of conserving his energies for this purpose, led him to give up this exacting field of practice in which he had attained an enviable success. He was eminently a family practitioner, deeply interested in people, and gave much more than his professional skill in his relations with his patients. He regarded his work as service in the most comprehensive sense of that term, and it may be assumed that the return which he received was quite inadequate to the time and devoted interest which he ungrudgingly gave. He felt strongly on many subjects and especially never failed to express his contempt for what he regarded as a mercenary tendency in medical practice. The idea of medicine as a source of profit was wholly alien to his mind. Although our faith at times may be shaken, the spirit of sacrifice will doubtless remain one of the best traditions of the profession of medicine, but it is indeed rare to find it exemplified in so modest and sincere a form as with him.

His main interest throughout his active life was his profession, but the same loyalty which he gave to it, found expression also in his devotion to his friends. Those who happened to be of the group of medical men who were associated with him first at college, and later at the medical school, will cherish the memory of his enthusiasm, his good fellowship and his loyal devotion to the interests of the club which they constituted. For some years past his summers have been spent at Essex, on the western shore of Lake Champlain, a region endeared to him by many associations. His fine gift for hospitality there found ample expression, as many of his friends can attest. Perhaps the most striking testimonial of the high regard in which he was held by all classes of the community in which he lived and did his work, was shown by the outpouring of people at the simple funeral services held at his house. He contributed little to the literature of medicine, but his claim to lasting recognition rests on the much firmer foundation of modesty regarding his attainments, perfect loyalty to his friends, his patients and his ideals, and a conscientious performance of the daily task of ministering to the afflicted, whether in body or spirit. His death leaves in many a family circle a peculiarly personal sense of bereavement.

Correspondence.

COMMITTEE ON STATE AND NATIONAL LEGISLATION.

BOSTON, MASS., March 13, 1916.

Mr. Editor: In the latest number of the JOURNAL there is a letter from Dr. Frank E. Lewis of Nantucket referring to the lack of opposition by the medical profession to a bill allowing the registration of "herb doctors."

Dr. Lewis says, "There should be committees appointed to meet these exigencies." He is probably not aware that the Committee on State and National Legislation of the Massachusetts Medical Society works unceasingly on these bills, but through a misunderstanding between the committee and the Board of Registration in Medicine no opponents appeared before the Public Health Committee. Through the intervention of the Committee on State and National Legislation a second hearing was granted at which physicians familiar with the subject were present and spoke in opposition.

Physicians may be apprised of legislative matters affecting public health through the columns of the BOSTON MEDICAL AND SURGICAL JOURNAL, and, if particularly interested, may subscribe to the *Legislative Bulletin* by sending their names and addresses, accompanied by two dollars for each subscription, to the Sergeant-at-Arms, State House, Boston.

Very truly yours,

WILLIAM H. ROBEY, JR., *Secretary*,
Committee on State and National
Legislation, The Massachusetts
Medical Society.

SOCIETY NOTICES.

HARVARD MEDICAL SOCIETY.—Historical Club Meeting in the Peter Bent Brigham Hospital Amphitheatre, Tuesday evening, April 4, at 8.15 o'clock.

PROGRAM.

"Medical Men Who Have Loved Music," Dr. Fielding H. Garrison of Washington, D. C.

"The History of the Discovery of the Secretory Glands and Their Function," Dr. Mortimer Frank of Chicago.

Medical students and physicians are cordially invited to attend.

ERNEST G. GREY, M.D., *Secretary*.

BOSTON SOCIETY FOR MEDICAL IMPROVEMENT.—A meeting of the Boston Society for Medical Improvement will be held in Sprague Hall, Medical Library, on Monday, April 3, 1916, at 8.15 P.M.

Memorial addresses:

Dr. David Williams Cheever.

By Dr. George W. Gay

Dr. John Collins Warren

Dr. James Clarke White.

By Dr. Abner Post

Dr. Frederick C. Shattuck

Friends of Dr. Cheever and Dr. White and members of the Suffolk District Medical Society are cordially invited.

DR. HERMAN F. VICKERY,

President.

DR. GEORGE G. SMITH,

Secretary.

RECENT DEATHS.

DR. WISNER ROBINSON TOWNSEND, of New York City, for many years secretary of the Medical Society of the State of New York, and a well-known orthopedist, was found dead in the area of his home, 125 West 58th Street, March 12, he having fallen through a low-silled window during the night. Dr. Townsend graduated from the College of Physicians and Surgeons, Columbia, in 1880, and served his apprenticeship as house officer in Bellevue Hospital. He held these positions: Associate surgeon, Hospital for Ruptured and Crippled; orthopedic surgeon, French Hospital; consulting surgeon, S. B. Smith Infirmary, and other hospitals. He was a member of the American Orthopedic Association and of the New England Association of Railway Surgeons and at one time was a member of the Board of Trustees of the American Medical Association. He was sixty years old.

DR. NATHAN GROSS ROZEMAN, who died of pneumonia on March 17, in New York City, was born at Montgomery, Ala., on Feb. 13, 1856, the son of Dr. Nathan Rozeman, chief surgeon on the staff of General Stonewall Jackson in the Confederate Army. The Junior Dr. Rozeman was a graduate of the University of Virginia, studied medicine at Paris and Vienna and had been a distinguished practitioner of surgery and gynecology at New York City.

DR. EDWARD RANDOLPH PEASLEE FOURTIN, a Fellow of the Massachusetts Medical Society, died of heart disease at Waltham, March 15, 1916, aged fifty years. He was a native of South Amesbury, and was a graduate of the Harvard Medical School in 1891. Following graduation, he practised in Butte, Montana, when he came East and served as house officer at the State Hospitals at Tewksbury, Foxboro and Monson, finally settling at Waltham. He had been in poor health for a year. He is survived by two daughters.